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**ABSTRACT *(maximum 200 words)*** The purpose of this thesis is to determine the barriers to more active contractor participation in the DOD Value Engineering (VE) program. A review of professional literature such as DOD Inspector General, General Accounting Office, and other research reports provide the background information necessary to explain potential barriers to more active contractor participation in the DOD VE program. Thirty telephone surveys were conducted with Government and contractor personnel to solicit the opinions of these acquisition professionals concerning barriers to more active contractor participation in the DOD VE Program. The results and analysis of the interviews are reported. It was concluded that there are four significant barriers preventing more active contractor participation in the DOD VE program. The four significant barriers to more active contractor participation in the DOD VE program are insufficient funding, the VECP submission and approval process, a low level of VE awareness among acquisition professionals, and a lack of support for the VE program among top-level DOD management. Recommendations to improve contractor participation in VE are establishment of a centrally managed VE fund, streamlining the VECP process, increased VE awareness training, additional VE personnel resources, enforcement of VE savings goals, and greater top-level management support.

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# BARRIERS TO MORE ACTIVE CONTRACTOR PARTICIPATION IN THE DEPARTMENT OF DEFENSE VALUE ENGINEERING PROGRAM

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Lieutenant, United States Navy
B.S.B.A., University of Florida, 1986

Submitted in partial fulfillment of the
requirements for the degree of

**MASTER OF SCIENCE IN MANAGEMENT**

from the

**NAVAL POSTGRADUATE SCHOOL**
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## ABSTRACT

The purpose of this thesis is to determine the barriers to more active contractor participation in the DOD Value Engineering (VE) program. A review of professional literature such as DOD Inspector General, General Accounting Office, and other research reports provide the background information necessary to explain potential barriers to more active contractor participation in the DOD VE program. Thirty telephone surveys were conducted with Government and contractor personnel to solicit the opinions of these acquisition professionals concerning barriers to more active contractor participation in the DOD VE Program. The results and analysis of the interviews are reported. It was concluded that there are four significant barriers preventing more active contractor participation in the DOD VE program. The four significant barriers to more active contractor participation in the DOD VE program are insufficient funding, the VECP submission and approval process, a low level of VE awareness among acquisition professionals, and a lack of support for the VE program among top-level DOD management. Recommendations to improve contractor participation in VE are establishment of a centrally managed VE fund, streamlining the VECP process, increased VE awareness training, additional VE personnel resources, enforcement of VE savings goals, and greater top-level management support.

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# I. INTRODUCTION

## A. GENERAL

The purpose of this thesis is to develop an understanding of the Department of Defense Value Engineering (VE) Program and investigate the barriers to more frequent contractor participation in VE. The researcher will also examine recent changes made to the VE program designed to increase contractor participation, and provide recommendations for methods to promote more active contractor participation in the DOD VE Program.

## B. OVERVIEW

Value Engineering has been used in the DOD for many years. The VE concept can trace its beginnings to the 1940's. The process, originally called value analysis, was developed during World War II. VE came about as an answer to the shortage of supplies and materials that was created as a result of this global crisis. The shortages forced manufacturing, production, and design personnel to find substitutes for the critical materials and components needed to manufacture products.

Today, VE has evolved to focus on the elimination or modification of any nonessential element of a Government contract that contributes to the overall cost of that contract. A recent Process Action Team, which was chartered by the Under Secretary of Defense for Acquisition and Technology, offered the following definition of VE:

> Value Engineering is a systematic effort directed at analyzing the functional requirements of systems, equipment, facilities, processes, and supplies for the purpose of achieving essential functions at the lowest total

cost, consistent with needed performance, safety, reliability, maintainability, and quality. [Ref. 1, p. 2-1]

It is important to distinguish between the concepts of value and cost because these ideas are distinct and central to VE. The distinction between value and cost must be fully understood in order to comprehend the purpose of the VE program. Value is defined as (1) the worth of a thing in money or goods at a certain time, and/or (2) the utility of an item in directly or indirectly satisfying a recognized need [Ref. 2, p. 23]. Cost is defined as: (1) general usage: the amount of money or equivalent incurred for supplies or services including profit or fee, and/or (2) in contracting: the amount of money or equivalent paid for supplies or services exclusive of profit or fee [Ref. 2, p. 19]. Value Engineering seeks to provide maximum value in the desired product or service while obtaining the minimum possible cost.

In the current Federal procurement environment every dollar's usage must be maximized. The continually shrinking portion of the DOD budget dedicated for new procurement demands that each dollar is carefully and efficiently obligated. Much of the latest wave of Acquisition Reform initiatives has focused on various ways to reduce the cost of the procurement of new Defense systems. Some examples of these initiatives include Cost as an Independent Variable (CAIV), Single Process Initiative (SPI), and Outsourcing. Value Engineering is not a part of Acquisition Reform, but it should continue to be reviewed when considering different acquisition strategies.

Value Engineering is an option available to Contracting Officers that is not a new idea. In fact, it has already yielded billions of dollars in acquisition cost savings. The purpose of VE is to analyze and redesign a product or service so that its function can be achieved at the lowest possible cost. Although the DOD has reaped substantial savings

using VE concepts there is still significant opportunity for more active contractor participation.

In Fiscal Year 1996, only 13% of the Navy's Major Defense Acquisition Programs reported benefits as a result of the use of VE. Throughout the DOD, the percentage of Major Defense Acquisition Programs in Fiscal Year 1996 that reported benefits from the use of VE was only 22%. [Ref. 3, p. 5] There is substantial room for improvement in the use of VE. This program, in conjunction with other cost saving initiatives, must be exploited in order to ensure that the Federal Government gets the maximum possible benefit from each dollar expended.

## C. RESEARCH OBJECTIVE

The purpose of this thesis is to develop an understanding of the DOD Value Engineering Program and evaluate the existing barriers to more frequent contractor participation in the DOD Value Engineering program. The researcher will also evaluate the impact of recent modifications to the VE program guidance and how these changes will affect contractor utilization of VE. It is the goal of the researcher to provide recommendations that would eliminate or reduce the existing barriers to contractor participation and thereby improve the effectiveness and usage of the VE program in the DOD. Furthermore, it is hoped that this thesis will provide readers with the information necessary to fully incorporate and exploit the VE program in as many defense contracts as possible.

## D. RESEARCH QUESTIONS

The primary research question is derived from the above stated research objective and asks: What are the barriers inhibiting contractors from actively participating in the DOD Value Engineering Program, and what actions could be taken to increase participation?

The following subsidiary research questions were developed to assist in answering the primary research question:

1. What will a literature review suggest are current barriers to contractors actively participating in the DOD Value Engineering Program?

2. What will a survey of contractor personnel suggest are current barriers to contractors actively participating in the DOD Value Engineering Program?

3. What will a survey of Government personnel suggest are current barriers to contractors actively participating in the DOD Value Engineering Program?

4. What will a survey of contractor personnel suggest are actions the DOD could take to increase active contractor participation in the Value Engineering Program?

5. What will a survey of Government personnel suggest are actions the DOD could take to increase active contractor participation in the Value Engineering Program?

6. What will analysis suggest about the likelihood that recent changes to the DOD Value Engineering Program will significantly increase active contractor participation?

7. What will analysis suggest are additional actions the DOD could take to increase active contractor participation in the DOD Value Engineering Program?

## E. SCOPE OF RESEARCH

This thesis develops an understanding of the DOD Value Engineering Program and the existing barriers to more active contractor participation in the program. The study focuses on current utilization of VE within the DOD and its major buying

commands. These include Naval Air Systems Command, Naval Sea Systems Command, Space and Naval Warfare Systems Command and the Defense Logistics Agency. This thesis will provide recommendations for more active contractor participation in the DOD Value Engineering program. Furthermore, it is assumed that the reader has a basic understanding of acquisition concepts, terminology, as well as the basics of major weapon systems acquisition.

## F. RESEARCH METHODOLOGY

The research methodology utilized in this study involved a comprehensive review of the available literature that was collected by means of an extensive literature search and thirty telephone interviews with key Value Engineering personnel in the DOD and in commercial industry. The literature research included a review of: (1) Professional journals and periodicals; (2) Research reports published by United States Military postgraduate schools; (3) United States DOD publications; and (4) Government audit reports. The interviews were informal and structured around the guidelines provided by the questions stated in Chapter IV of this thesis.

## G. ORGANIZATION OF THE STUDY

The next chapter provides background information and a historical perspective of the Value Engineering program and discusses the present policies that guide the program.

Chapter III reviews relevant literature, including audits and reports, concerning the DOD VE program and contractor use of the program. These audits and reports were completed by various organizations including the General Accounting Office, DOD

Inspector General, and a Process Action Team chartered by the Under Secretary of Defense for Acquisition and Technology.

Chapter IV presents the responses of acquisition professionals involved in VE, both Government and contractor, to the questions the researcher posed to them during telephone interviews held in April and May of 1998. Chapter IV also presents the barriers to more active contractor participation in VE revealed as a result of the extensive literature review and the telephone interviews with acquisition professionals.

The final chapter will address conclusions and recommendations, provide detailed answers to the research questions, and suggest additional areas for further research in the area of Value Engineering.

## II. VALUE ENGINEERING BACKGROUND AND DOD POLICY

The purpose of this chapter is to provide substantial background information in the area of Value Engineering (VE) in order to develop an understanding of VE in DOD. This chapter will first discuss the origin and central themes of VE and then present the current regulations that govern the use of VE in DOD. Also, the history of VE in DOD, the Value Engineering Change Proposal (VECP) process, and the current state of the use of VE in DOD will be presented, as well as a recent example of the successful application of VE in DOD procurement. This information framework is necessary to properly address the research questions that are the purpose of this study.

### A. THE BEGINNINGS OF VALUE ENGINEERING

The process referred to in the DOD as VE was initially developed in the commercial sector for commercial applications. Employees at General Electric originated the process in the late 1940's. Employees at General Electric were encouraged to design and manufacture products in non-traditional ways because of problems created by World War II. VE came about as an answer to the shortage of supplies and materials that developed as a result of this crisis. The shortages forced manufacturing, production, and design personnel at General Electric to find substitutes for the critical materials and components needed to manufacture products.

Harry Erlicher, then Vice President of Purchasing for the General Electric Company, observed that many of the required substitutions during this period resulted not only in reduced costs but also in product improvement. Consequently, Mr. Erlicher assigned to L. D. Miles the task of developing a systematic approach to the investigation

of the *function/cost* aspect of *existing* material specifications. Larry Miles not only met this challenge successfully, but subsequently pioneered the scientific procurement concept General Electric called "Value Analysis". [Ref. 4, p. 645]

Value Engineering is considered synonymous with the terms Value Analysis, Value Management, Value Control, and Value Improvement. For the purposes of this research the DOD term, Value Engineering, will consistently be used.

Mr. Miles defined Value Engineering as,

> A philosophy implemented by the use of a specific set of techniques, a body of knowledge, and a group of learned skills. It is an organized creative approach, which has for its purpose the efficient identification of unnecessary cost. [Ref. 5, p. 1]

Mr. Miles saw the value in this unique approach and believed the concept could have broad implications throughout the wide realm of business practices. He believed that VE, if properly embraced and implemented, could be used in many different areas including engineering, manufacturing, marketing, procurement, sales, quality control, and management.

Mr. Miles used a very basic approach to define and implement the concept of VE. He believed that in order to determine whether VE could provide value to products three simple steps should be taken. These basic steps are followed by a series of five questions. The three basic steps and five simple questions identify the basic characteristics and purpose of a product. This information must be known before making any VE decisions. The three basic steps are:

1. Identify the function.
2. Evaluate the function by comparison.
3. Cause value alternatives to be developed. [Ref. 5, p. 14]

After the completion of these three basic steps, addressing the five basic questions introduced by Miles continues the investigation into alternatives. The five questions are designed to reveal the pertinent facts associated with a particular product. The five basic questions are:

1. What is the item?
2. What does it cost?
3. What does it do?
4. What else would do the job?
5. What would the alternative cost? [Ref. 5, p. 18]

After answers to these questions are developed a well-informed decision concerning VE can be made. Although these questions seem basic and relatively easy to answer, their importance cannot be underestimated. Mr. Miles knew that without adequate answers to each of these questions a cost reduction decision could be less than sound. Sufficient time and effort must be invested in order to develop sufficient answers to each of these crucial questions.

## B. VALUE ENGINEERING REGULATORY POLICY

### 1. Federal Acquisition Regulation Part 48 "Value Engineering"

Federal Acquisition Regulation (FAR) Part 48 prescribes the policies and procedures for using and administering VE techniques in contracts in the DOD. FAR Part 48 is the principal guidance used by DOD contracting officers to implement VE techniques in defense acquisition contracts.

The purpose of VE is to reduce costs while maintaining or improving the quality of a product or service. FAR Part 48 provides the avenue to capitalize on VE methods in defense procurement. VE is described in FAR Part 48 as the formal technique by which contractors may:

1. Voluntarily suggest methods for performing more economically and share in any resulting savings or

2. Be required to establish a program to identify and submit to the Government methods for performing more economically. VE attempts to eliminate, without impairing essential functions or characteristics, anything that increases acquisition, operation, or support costs. [Ref. 6, p. 3]

FAR Part 48 also outlines the two DOD VE approaches:

1. The first is an incentive approach in which contractor participation is voluntary and the contractor uses its own resources to develop and submit any VECPs. The contract provides for sharing of savings and for payment of the contractor's allowable development and implementation costs only if a VECP is accepted. This voluntary approach should not in itself increase costs to the Government. [Ref. 6, p. 4]

2. The second approach is a mandatory program in which the Government requires and pays for a specific VE program effort. The contractor must perform VE of the scope and level of effort required by the Government's program plan and included as a separately priced item of work in the contract Schedule. No VE sharing is permitted in architect engineer contracts. All other contracts with a program clause share in savings on accepted VECPs, but at a lower percentage rate than under the voluntary approach. The objective of this VE program requirement is to ensure that the contractor's VE effort is applied to areas of the contract that offer opportunities for considerable savings consistent with the functional requirements of the end item of the contract. [Ref. 6, p. 4]

VE clauses are required on acquisition contracts, including subcontracts, exceeding $100,000. The contracting officer may require a VE clause for contracts under $100,000 if it is believed that potential savings can be achieved. The FAR requires the contracting officer to exempt VE clauses from the following solicitations and contracts:

(1) For research and development other than full-scale development;

(2) For engineering services from not-for-profit or nonprofit organizations;

(3) For personal services;

(4) Providing for product or component improvement, unless the value engineering incentive application is restricted to areas not covered by provisions for product or component improvement;

(5) For commercial products that do not involve packaging specifications or other special requirements or specifications; or

(6) When the agency head has exempted VE from the contract requirements; [Ref. 6, p. 9]

FAR Part 48 also provides the appropriate sharing arrangements that are available under the VE contract provisions. The sharing ratios are dependent on the type of contract and the sharing arrangement (voluntary or mandatory) agreed upon in the contract. Figure 1 below displays the available sharing arrangements under FAR Part 48.

The Director of Defense Procurement Eleanor R. Spector, authorized, in a memorandum dated April 10, 1997, all military departments and defense agencies to deviate from certain requirements contained in FAR Part 48. The purpose of the memorandum was to stimulate more contractor participation in VE. The class deviation authorizes contracting officers to use revised FAR language when administering VE techniques. The revised FAR language changes the sharing period from the current three years to a range of three to five years; the incentive sharing arrangement from the current fixed rate for the contractor of 50 percent to a range of 50 to 75 percent; and the current fixed contractor shared collateral savings rate of 20 percent to a range of 20 to 100 percent. The class deviation is approved for a two-year period ending March 31, 1999, or until the FAR is revised, whichever occurs first. [Ref. 7, p. 1]

**Government/Contractor Shares of Net Acquisition Savings**
**(Figures in Percent)**

| | Sharing Arrangement | | | |
|---|---|---|---|---|
| | Incentive (Voluntary) | | Program Requirement (Mandatory) | |
| Contract Type | Instant Contract Rate | Concurrent and Future Contract Rate | Instant Contract Rate | Concurrent and Future Contract Rate |
| Fixed-price (other than incentive) | 50/50 | 50/50 | 75/25 | 75/25 |
| Incentive (fixed-price or cost) | * | 50/50 | * | 75/25 |
| Cost-reimbursement (other than incentive)** | 75/25 | 75/25 | 85/15 | 85/15 |

* ***Same sharing arrangement as the contract's profit or fee adjustment formula.***

** ***Includes cost-plus-award-fee contracts.***

Figure 1. From [Ref. 6]

The processing of VECPs is the responsibility of the contracting officer. The contracting officer or other designated official is tasked to promptly process and objectively evaluate each VECP. The Government is responsible for accepting or rejecting the VECP within 45 days of receipt [Ref. 6, p. 3]. If the Government will need more time to evaluate the VECP, the contracting officer is required to notify the contractor promptly in writing, giving the reasons and the anticipated decision date. Any VECP may be approved, in whole or in part, by a contract modification incorporating the

VECP. The decision to accept or reject a VECP; determination of collateral costs or collateral savings; and the decision as to which of the sharing rates applies, are not subject to the disputes clause or otherwise subject to litigation under the Contract Disputes Act of 1978. [Ref. 6, p. 3]

### 2. OMB Circular A-131 "Value Engineering"

Issued on May 21, 1993, this Circular supplements the VE guidance provided in FAR Part 48. OMB Circular A-131 places a requirement on Federal Departments and Agencies to use VE as a management tool, where appropriate, to reduce program and acquisition costs. [Ref. 8, p. 1]

OMB Circular A-131 describes VE as an effective technique for reducing costs, increasing productivity, and improving quality. The Circular states that VE can be applied to hardware and software; development, production, and manufacturing; specifications, standards, contract requirements, and other acquisition program documentation; facilities design and construction. Also, VE may be successfully introduced at any point in the life cycle of products, systems, or procedures. VE is a technique directed toward analyzing the functions of an item or process to determine "best value," or the best relationship between worth and cost. In other words, an item or process that consistently performs the required basic function and has the lowest total cost represents "best value". [Ref. 8, p. 1]

OMB Circular A-131 also provides policy guidance on the use of VE. The Circular states that Federal agencies shall use VE as a management tool, where appropriate, to ensure realistic budgets, identify and remove nonessential capital and operating costs, and improve and maintain optimum quality of program and acquisition functions. Senior management will establish and maintain VE programs, procedures and

processes to provide for the aggressive, systematic development and maintenance of the most effective, efficient, economical, and environmentally-sound arrangements for conducting the work of agencies, and to provide a sound basis for identifying and reporting accomplishments. [Ref. 8, p. 3]

Additionally, OMB Circular A-131 provides agency responsibilities designed to ensure that systematic VE improvements are achieved. Agencies shall at a minimum:

1. Designate a senior management official to monitor and coordinate agency VE efforts.

2. Develop criteria and guidelines for both in-house personnel and contractors to identify programs/projects with the most potential to yield savings from the application of VE techniques. The criteria and guidelines should recognize that the potential savings are greatest during the planning, design, and other early phases of project/program/system/product development. Agency guidelines will include:

    (a) Measuring the net life cycle cost savings from value engineering. The net life-cycle cost savings from value engineering is determined by subtracting the Government's cost of performing the value engineering function over the life of the program from the value of the total saving generated by the value engineering function.

    (b) Dollar amount thresholds for projects/programs requiring the application of VE. The minimum threshold for agency projects and programs, which require the application of VE, is $1 million. Lower thresholds may be established at agency discretion for projects having a major impact on agency operations.

    (c) Criteria for granting waivers to the requirement to conduct VE studies, in accordance with the FAR 48.201(a).

    (d) Guidance to ensure that the application of VE to construction projects/programs and other projects/programs, will include consideration of environmentally-sound and energy efficient considerations to arrive at environmentally-sound and energy efficient results.

3. Assign responsibility to the senior management official designated pursuant to section 8a above, to grant waivers of the requirement to conduct VE studies on certain programs and projects. This responsibility may be delegated to other appropriate officials.

4. Provide training in VE techniques to agency staff responsible for coordinating and monitoring VE efforts and for staff responsible for developing, reviewing, analyzing, and carrying out VE proposals, change proposals, and evaluations.

5. Ensure that funds necessary for conducting agency VE efforts are included in annual budget requests to OMB.

6. Maintain files on projects/programs/systems/products that meet agency criteria for requiring the use of VE techniques. Documentation should include reasons for granting waivers of VE studies on projects/programs, which met agency criteria. Reasons for not implementing recommendations made in VE proposals should also be documented.

7. Adhere to the acquisition requirements of the FAR, including the use of VE clauses set forth in Part 48.

8. Develop annual plans for using VE in the agency. At a minimum, the plans should identify both the in-house and contractor projects, programs, systems, products, etc., to which VE techniques will be applied in the next fiscal year, and the estimated costs of these projects. These projects should be listed by category, as required in the agency's annual report to OMB. VEPs and VECPs should be included under the appropriate category. Annual plans will be made available for OMB review upon request.

9. Report annually to OMB on VE activities. [Ref. 8, p. 3-4]

The VE reports are required by all Federal Agencies except those that have a total budget authority of less than $10 million or total procurement obligations that do not exceed $10 million in a given Fiscal Year. The three-part report, which is due to OMB by December 31st, is designed to provide the Fiscal Year results of the agencies VE program.

## C. VALUE ENGINEERING IN DOD

DOD involvement in VE began in the United States Navy. In 1954, the U.S. Navy's Bureau of Ships adopted a modified version of General Electric's value analysis

concept in an attempt to reduce the construction cost of ships and related equipment. In applying the concept, the Navy directed its efforts primarily at cost avoidance during the *initial engineering design stage* and called the program "value engineering", even though it embodied the same concepts and techniques as General Electric's value analysis program. [Ref. 4, p. 645]

As a result of the Navy's initial success with the VE program, the Army and Air Force began VE programs. The DOD formally established its VE program in 1963 [Ref. 9, p. 2].

**1. DOD Value Engineering Program**

The DOD VE program consists of two distinct components: an in-house effort and a contractor effort. The in-house effort is directed toward improving internal DOD operations through VE studies. The studies are conducted and the results implemented by Defense personnel. Government ideas are submitted using the Value Engineering Proposal (VEP) and if accepted, the originator may be rewarded for their efforts with a cash bonus.

The contractor component was developed to stimulate contractors to submit Value Engineering Change Proposals (VECPs) to modify contract specifications they feel impose costly, nonessential requirements. The incentive to the contractor is a share of any savings that result. [Ref. 9, p. 2]

The contractor component of the program is implemented by including VE clauses in acquisition contracts. The clauses are of two types: the incentive clause and the program requirements clause. The incentive clause is a contract provision that encourages the contractor to voluntarily develop and submit cost saving ideas (VECPs). These proposals are developed using the contractor's own funds, which are put at risk; if

a contractor's idea is not accepted by the Government, the contractor has no opportunity to recoup its investment. [Ref. 1 p. 2-1]

The program requirements clause is a Government funded contract provision that requires contractors to engage in a specific level of VE activity. Cost saving ideas which result in VECPs are incentivized, but rewards paid under the program requirements clause are less than those paid under the VE Incentives Clause because the contractors have none of their own money at risk. [Ref. 1, p. 2-1]

**2. VECP Process**

A diagram of the basic process governing the submission, review and approval of the VECPs is shown below in Figure 2. The model below depicts the VECP process in its most typical form as there are slight differences in the process among the various

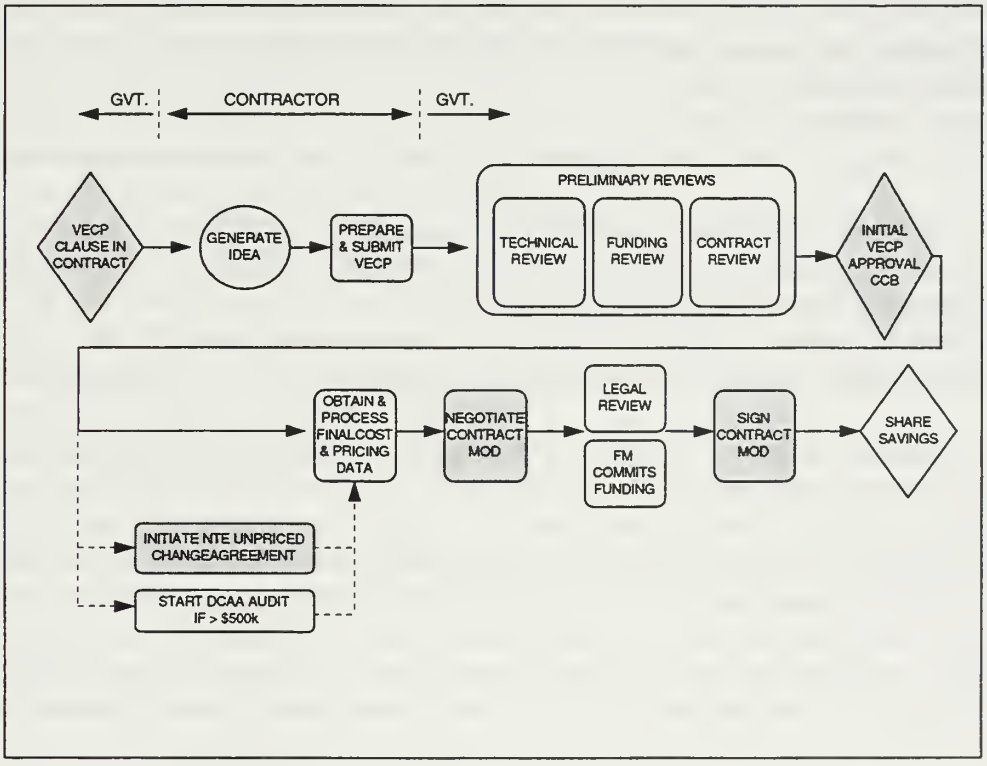



Figure 2. VECP Flowchart
[Ref. 1, p. 2-5]

Services in DOD. The following paragraphs detail the purpose, product and major players in each step in the VECP process. [Ref. 1, p. 2-6]

1. **Change Clause In Contract**. The VE clause is added to a contract. It invites the contractor to identify changes to reduce cost or improve the product and makes provision for the contractor to substantially share in the savings which accrue from implementing the change. In order to qualify as a VECP, the proposed change must 1) require modification to the contract under which it is submitted, and 2) provide an overall cost savings to the Government if accepted and implemented.
Product: A VE clause is added to the contract. Most Government contracts over $100K include a VE clause.
Major Player(s): Program Management Office, Procuring Contracting Officer (PCO).

2. **Generate Ideas**. The Contractor identifies a way to save costs by simplifying the design, changing the material, by changing the managerial, accounting, quality control, or manufacturing processes required in the contract.
Product: An idea that saves money
Major Player(s): Contractor

3. **Prepare and Submit VECP**. The contractor prepares a VECP containing contract number; points of contact; title; description of change; need for change; effect on delivery schedule; related contracts; list of components/ parts/sub-systems which are affected by the change; implementation costs; savings; schedule changes; and diagrams/charts/drawings.
Product: VECP
Major Player(s): Contractor engineers, cost analysts, and contracting personnel.

4. **Preliminary Reviews**. The VECP is submitted to the PM and/or Configuration Control Board where it is reviewed for completeness and distributed for technical, funding, and contractual review.
Product: A recommendation to the PM and Configuration Control Board
Major Player(s): Government VE Program Manager or Project Engineer, DCMC.

5. **Technical Review**. Program Office functional experts determine if the recommended change is advantageous and if it needs to be tested or validated. If the change applies to a product that is on a qualified products list, air worthiness certified or similarly qualified, the technical review may identify the requirement for component testing to verify that the system performance has not been degraded. The functional experts determine what components, sub-systems, drawing, specifications, regulations, processes, provisions, training, technical manuals, packaging, preservation, and other elements are affected by the change. The VE program manager or project engineer collects the recommendations from reviewers for presentation to the PM and the Configuration Control Board.
Product: Determination of technical acceptability and desirability.
Major Player(s): Government PMO engineering and other functional experts

6. **Funding Review**. PM representatives review the VECP cost and savings section and assess its accuracy. Funds must be available or be made available to pay all costs. If there are savings in the first year, the Contractor gets their share by an increased obligation on the instant contract.
Product: Validation that funds are available and in the correct appropriation.
Major Player(s): Government Program Management Office Program Analysis

7. **Contract Review**. The PCO determines the source of the idea (contractor or Government), its applicability to current contract(s), its potential to generate collateral savings, and the extent to which the cost/savings are allowable.
Product: Internal Government report
Major Player(s): PCO

8. **Initial VECP Approval by Configuration Control Board**. The CCB approves all changes to the system baseline and maintains all drawings, specifications, and other technical data concerning the system.
Product: VECP approval/disapproval, or request for additional data.
Major Player(s): Government PM; Engineering, Logistics, Safety, and Quality personnel.

9. **Initiate Not-to-Exceed (NTE) Undefinitized Contractual Action (UCA)**. A NTE UCA is an optional, quick contract modification that allows the contractor to begin implementing the VE change before the final contract modification is negotiated and definitized. Saving shares are negotiated later and the contract action is completed with a final supplemental agreement (SA). The NTE is included to set a limit on the amount the contractor can charge for the effort. The savings are calculated as usual with royalties starting when the SA is done. The savings are always shown as a net amount, i.e., after all costs have been recovered.
Product: A contract modification using a NTE UCA
Major Player(s): PCO

10. **Start DCAA audit if savings are greater than $500K**. The Defense Contract Audit Agency (DCAA) provides contract audit services, to include accounting and financial advisory services. If the savings are greater than $500K policy requires that DCAA audit the contractor's accounting system.
Product: Audit Report to the PCO
Major Player(s): DCAA, PCO

11. **Obtain & Process Final Cost & Pricing Data**. The PCO performs a price or cost analysis to establish a baseline from which to negotiate a "fair and reasonable price" for the Government. In addition, the cost or pricing data must be current and correct on the date the negotiations are complete. The PCO uses the provisions in Public Law 87-653, Truth in Negotiation Act (TINA), to obtain cost or pricing data from the contractor.
Product: Cost or Price Analysis
Major Player(s): PCO, Price Analyst, Buyer and DCMC/DCAA

12. **Negotiate Contract Modification**. The PCO negotiates the fair and reasonable agreement for the Government. Areas of discussion include the statement of work, skill level of labor, period of performance, test and validation requirements, delivery rates and sharing ratios.
Product: Draft Contract Modification
Major Player(s): Contractor and Government Procurement Officers, PMs, Project Engineers and Lawyers

13. **Legal Review**. A legal review assures the contract modification is executable, contains clear direction, and is unambiguous.
Product: Final Draft Contract Modification
Major Player(s): Contractor and Government Lawyers

13. **Financial Manager Commits Funding**. If there is a negative instant contract savings, the Government identifies and commits the funds. If collateral savings are realized, the Government must also identify and commit funds for this savings.
Product: Funding commitment documentation
Major Player(s): Government Fiscal Resource Manager

14. **Award Contract Modification**. The PCO awards the contract modification and the Government incurs an obligation or de-obligation. The contractor is obligated to perform the change.
Product: Contract Modification Award
Major Player(s): Contractor and Government Contracting Officers.

15. **Share Savings**. The contractor receives their share of the savings. The savings are paid after contract modification and following receipt of deliveries modified per the VECP.
Product: Additional profits for the contractor and additional program funds for the Government.
Major Player(s): Government PM and Contractor's owners.

## D. AN EXAMPLE OF VALUE ENGINEERING IN DOD

At this point it is appropriate to provide an example of the application of VE to a weapon system within the DOD acquisition process. The purpose of this example is to illustrate how the VE process is applied within DOD and to assist the reader in relating the basic concepts of VE to an actual system acquisition.

The recent procurement of the AN/ARC-210 very high frequency/ultra high frequency (VHF/UHF) electronic protection communications system is an example of the

use of the VE process within DOD. The ARC-210 program began in the mid- to late 1980s as a communication system primarily intended for tactical aircraft applications on both fixed and rotary wing platforms. The operational capabilities provided by the ARC-210 are many, yet it is small and lightweight, and relatively easy to integrate into existing and new production platforms. Operationally, the ARC-210 solves the communications interoperability problems that have existed for many years among the services and allied nations in VHF/UHF frequency bands [Ref. 10, p. 15].

The planned inventory for the ARC-210 at program conception was in excess of 10,000 units, and a reasonable annual production build rate was planned. By the time the ARC-210 was ready for production, the planned inventory and yearly production quantities dropped substantially (essentially cut in half) in keeping with the force structure downsizing (fewer aircraft/platforms equates to fewer radios). [Ref. 10, p. 16] It quickly became apparent to both the Government and the contractor that the resulting higher unit cost projections would substantially pinch off the market for this badly needed capability unless the unit costs and life cycle costs could be contained and or reduced [Ref. 10, p. 16].

The Air Combat Electronics Program Office within Naval Air Systems Command (NAVAIR) and Rockwell's Collins Avionics & Communications Division decided to work together to reduce the ARC-210's unit and life cycle costs. The team's primary objective was to significantly lower the acquisition cost of the ARC-210 without negatively impacting its performance characteristics or integrity. As this activity progressed, the team also undertook the task of markedly improving the cost side of the "life cycle equation." [Ref. 10, p. 16] Improving the cost side of the life cycle equation

for the ARC-210 meant increasing the mean-time-between-failure (MTBF) of the communication system. Lowering the MTBF would decrease maintenance costs and increase operational readiness.

In order to accomplish cost reduction goals the team spent several weeks rewriting the specifications for the ARC-210. The purpose of rewriting the specifications was to eliminate all non-value added military specifications (MIL-SPECS) and standards. The new document produced was the product description document (PDD). The statement of work (SOW) was also rewritten in order to give the contractor the latitude to comply with the requirements in the PDD in the most cost-efficient manner. Finally, a reliability improvement warranty (RIW) was established that set mean-time-between-failure (MTBF) objectives that the contractor was required to meet in order to avoid financial penalties. [Ref. 10, p. 16]

Once the content and parameters of the PDD, SOW, and RIW were agreed to, the method of implementing the required modifications to the existing and anticipated production contracts had to be resolved. The Government and contractor agreed to use a VECP to implement the contract changes. The arrangement that was agreed to in the ARC-210 procurement was unique. The contractor agreed to a no-cost VECP, wherein the contractor retains all the savings on the current contract and the Government retains all future savings. [Ref. 10, p. 17]

Program performance has exceeded the expectations of both parties [Ref. 10, p. 18]. The ARC-210 program VECP resulted in reduced acquisition costs, improved operational readiness/availability, and improved MTBF performance. [Ref. 10, p. 18] The ARC-210 program team was recognized for its accomplishments by DOD with the

Superior Management Award, the Logistics Life Cycle Cost Reduction Award, and the Navy's 1996 Value Engineering Change Proposal Award. [Ref. 10, p. 18]

## E. CURRENT STATE OF VALUE ENGINEERING IN DOD

The use of VE has resulted in the achievement of significant savings in the DOD. These savings have come in many different areas of defense spending. These different areas include major weapon systems development and production, military construction projects, and logistics support. In a recent memorandum issued to all the major DOD activities, the Under Secretary of Defense (Acquisition and Technology) USD (A&T) stated:

> We are being challenged as never before to achieve force modernization requirements under increasingly severe fiscal constraints. To successfully meet this goal we must exploit every possible cost reduction tool and technique available to us. VE has proven to be a valuable program survival tool when aggressively applied, not only cutting cost, but also improving performance. Since 1983, VE has contributed more than $20 billion in savings to the DOD. [Ref. 11, p. 1]

This statement clearly demonstrates the strong support that the leadership of the DOD acquisition force has for the VE concept. However, participation in the VE program has often fluctuated in its 35 years of existence and consequently the program's success has been inconsistent. VE savings have shown an overall-declining trend in the last decade, as illustrated in Figure 3 below.

The VE savings in 1987 were well over $500 million; in 1996 the savings achieved dropped to less than $100 million. The VE savings in 1996 ($95 million) are only 17% of the 1987 savings ($558 million). Analysis suggests this significant decline

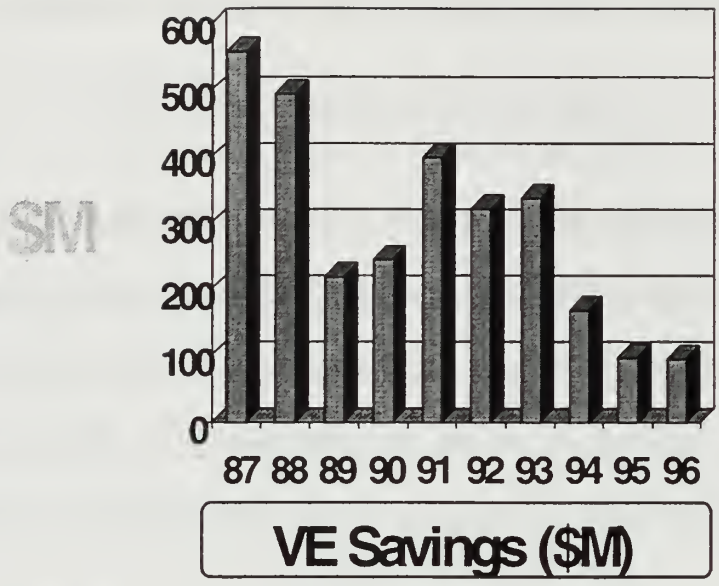



Figure 3. Value Engineering Savings 1987 – 1996
From [Ref. 1, p. 3-1]

in VE savings can be partially attributed to the downturn in defense spending. During the period from 1987-1996, procurement Total Obligation Authority (TOA) declined 47% (from $83 billion to $44 billion). During the same period, VE savings declined 83% (from $558 million to $95 million). [Ref. 1, p. 3-1]

Evidence of the current state of VE in DOD is its apparently infrequent use in the most expensive DOD spending programs. Major Defense Acquisition Programs (MDAPs) typically account for the majority of defense acquisition spending. A MDAP is an acquisition program that is estimated by the USD (A&T) to require an eventual total expenditure for research, development, test and evaluation of more than $355 million in Fiscal Year 1996 constant year dollars or, for procurement, of more than $2.135 billion in Fiscal Year 1996 constant year dollars [Ref. 12, p. 3].

These programs would seem to offer excellent opportunities to implement VE and achieve significant savings. However, many MDAPs did not have any reported VE activity during Fiscal Years 1994, 1995 and 1996. During Fiscal Year 1994, of 79 total MDAPs, only 14 MDAPs (7 Army, 1 Navy, 3 Air Force, and 3 Ballistic Missile Defense Organizations) reported VE activity and for Fiscal Year 1995, of 82, only 16 MDAPs (11 Army, 2 Navy, 1 Air Force, and 2 Ballistic Missile Defense Organizations) reported VE activity [Ref. 13, p. 5]. In Fiscal Year 1996, of 82, only 18 MDAPs (9 Army, 4 Navy, 2 Air Force, and 3 Ballistic Missile Defense Organizations) reported VE activity [Ref. 3, p. 1].

A further example of the reluctant use of VE in the DOD can be found by observing the VE activity in the Navy's MDAPs. The results of a study of the Navy's use of VE on MDAPs indicate that there are some significant problem areas. The Navy reported VE savings on only two MDAPs during Fiscal Years 1994 and 1995, although the Navy had 36 Category 1D and 30 Category 1C MDAPs during that period [Ref. 14, p. 16]. In other words, the Navy garnered VE savings in only ***three percent*** of MDAPs in Fiscal Years 1994 and 1995. The fiscal year 1996-1997 DOD VE Strategic Plan established a goal to have documented VE activity in 100% of MDAPs. The only two programs that reported VE savings were Naval Air Systems Command's F/A-18 aircraft program and Naval Sea Systems Command's Guided Missile Destroyer Program (DDG-51). The total estimated program authority for Fiscal Years 1994 and 1995 MDAPs was $488.9 billion, to include $411 billion for procurement. However, only $104.6 million of VE savings were reported for those MDAPs during Fiscal Years 1994 and 1995. These figures indicate that savings from VE were less than .00025 percent of program authority

on the Navy's MDAPs. This is significantly less than the VE savings goal of one percent of Total Obligation Authority (TOA) that was recently established in DOD's 1996-1997 VE Strategic Plan.

Finally, another method for assessing the success of the VE program in the DOD is to compare the savings garnered through the use of VE to Total Obligation Authority (TOA). The savings reported by the DOD from Value Engineering Proposals (VEPs) and Value Engineering Change Proposals (VECPs) accounted for less than one percent of TOA during Fiscal Years 1994, 1995, and 1996 [Ref. 13, p. 4]. In fact, the reported VE savings only accounted for about .3 percent of TOA during each period as shown in Table 1.

| | FY 1994 | FY 1995 | FY 1996 |
|---|---|---|---|
| **In-House VEPs** | 688.20 | 638.44 | 673.90 |
| **Contractor Initiated VECPs** | 166.77 | 95.94 | 93.84 |
| **Total VE Savings** | 854.97 | 734.38 | 767.74 |
| **TOA** | 251,953.00 | 253,954.00 | 254,919.00 |
| **Percentage of TOA reported as VE savings** | 0.3% | 0.3% | 0.3% |

Table 1. FY 1994, 1995, 1996 VEPs and VECPs Reported Savings
($ in Millions)

These low VE savings rates indicate that there may be significant barriers preventing more active contractor participation in the VE program. According to the Fiscal Year 1996-1997 DOD VE Strategic Plan, the overall savings goal for the VE

program is one percent of Total Obligation Authority (TOA). Achieving this goal will require substantial improvement over the recent and current savings rates. Increased contractor participation in VE will be necessary if DOD's VE goal is to be reached or surpassed. Increased contractor participation in VE must come in MDAPs and other defense acquisition programs, as well as in efforts to reduce acquisition life cycle costs. It is the goal of the researcher to provide recommendations that will result in more active contractor participation in the VE program.

## F. SUMMARY

Value Engineering has been used successfully in the DOD and in Federal Agencies for many years and it has resulted in large dollar savings. VE is considered by Defense Acquisition leaders to be an important, viable program. Yet, the recent trend of declining savings through the use of VE in the DOD has been well documented. The guidance provided in the FAR and in OMB Circular A-131 clearly state the objectives of the VE program, but in the DOD the use of VE has become sporadic and less frequent. Clearly, reasons exist which prevent contractors from engaging in more active participation in the VE program.

Chapter III will discuss the barriers to more active DOD contractor participation in VE. The discussion will be based upon a review of the pertinent literature available on the DOD VE program.

# III. AUDITS OF CONTRACTOR PARTICIPATION IN THE DOD VALUE ENGINEERING PROGRAM

This Chapter summarizes a representative sampling of reports by the U. S. General Accounting Office (GAO) and the Department of Defense Inspector General (DODIG). A summary of the Under Secretary of Defense for Acquisition and Technology (USD A&T) VECP Process Action Team Report is also included.

The purpose of this chapter is two-fold: (1) to identify the common problems discovered by Government auditors in the participation of contractors in the DOD VE program; and (2) to identify the potential barriers that exist in the DOD VE program which discourage or prevent more active contractor participation in VE.

## A. REPORTS BY THE U. S. GENERAL ACCOUNTING OFFICE

GAO has conducted numerous audits on the Federal Government's attempts to use VE to improve product quality and reduce acquisition costs. The initial GAO report on the VE program was issued in 1969. Several of the GAO reports on VE have focused specifically on the use of VE in DOD. The findings of three of the 17 VE reports issued by GAO are discussed here. The three GAO reports presented focus on the use of VE in the DOD.

"Department of Defense Value Engineering Program Needs Top Management Support," (PSAD-78-5, November 16, 1977)

In its initial VE report issued in August 1969, GAO found that the DOD VE program had not produced desired cost savings. The 1977 GAO review was conducted to reexamine the progress and current status of the DOD VE program for contractors. In the November 1997 report, DOD, Army, Air Force, and Navy officials were interviewed and

the appropriate records and reports pertaining to the DOD VE program for contractors were reviewed.

This follow-up audit revealed continuing problems with the VE program for contractors and concluded the program fell far short of its potential. The reasons cited by GAO for the VE program deficiencies were: (1) very little management support for the VE program; (2) no effort to provide funding for the program; (3) reductions in the number of personnel assigned to support the VE program; and (4) inadequate training available for personnel in the use and administration of VE contract clauses. [Ref. 9, p. 12]

The GAO report concluded that a lack of Defense management acceptance and support was the basic and most critical factor impeding the performance of the DOD VE program for contractors. This same management problem was also documented in the 1969 GAO report on VE. GAO considered correction of this weakness critical and the most essential element to improving the program's performance.

"Value Engineering Should Be Improved As Part Of The Defense Department's Approach To Reducing Acquisition Cost," (AFMD-83-78, September 27, 1983)

This audit was conducted in order to provide an update to the 1977 GAO VE report that was discussed above. The focus of the report was on the contractor component of the DOD VE program. The report described the current status of the program and recommended improvements in four major areas.

In fiscal year 1980, the DOD established an annual goal for VECP savings; seven-tenths of one percent of each Service's total procurement obligation authority. GAO reported that the Defense Department had never successfully achieved this

goal. Also, at the time of GAO's review, 28 of 46 major weapon systems, or 40 percent, lacked active VE programs.

GAO identified four problem areas in contractor participation in the DOD VE program. The auditors recommended that the DOD take management action in these areas to improve contractor participation in the VE program:

(1) **Increase top level visibility and support.** The contractor component of the VE program is not systematically monitored to ensure continuous top level visibility and support.

(2) **Incentives for Defense personnel.** Perhaps because top-level support is lacking, Defense personnel are not sufficiently motivated first to encourage contractors to submit VECPs, and then to process them fairly and expeditiously.

(3) **Contractor awareness and confidence.** Some contractors and subcontractors do not understand the VE program, or they do not believe that the VECPs they submit will receive fair and expeditious treatment.

(4) **Weaknesses in the Navy program.** The Navy's poor performance under the contractor component of the VE program is directly linked to the Navy's lack of management emphasis. An action plan is needed to improve the Navy's performance. [Ref. 15, p. iii]

The auditors determined that a strong VE program was an important technique for productivity improvement and cost reduction in the DOD. GAO also recognized the VE program as only one of many useful techniques for improving productivity and reducing costs at defense contractors. GAO stated that VE should be integrated into an overall Defense program of productivity improvement and cost reduction. Also, GAO found that the desired savings would not be achievable unless the problems outlined above were properly addressed and corrective action taken.

"Value Engineering: Usefulness Well Established When Applied Appropriately," (T-GGD-92-55, June 23, 1992)

This GAO report was given as testimony to the House of Representatives Subcommittee on Legislation and National Security. The subcommittee was considering a bill that would require VE reviews for certain types of Federal contracts. The bill was titled the "Systematic Approach for Value Engineering Act."

GAO reiterated that the DOD could substantially increase VE program savings by increasing top-level management support and monitoring. The report also emphasized that there were significant opportunities for expanding or improving the participation of contractors in VE.

GAO advised Subcommittee members to proceed cautiously when considering legislation that would mandate the use of VE in all situations. The testimony pointed out that current policies allowed agencies some flexibility in the use of VE. GAO viewed this flexibility as important for two reasons: (1) VE reviews can be expensive; and (2) VE proposals will not always recover the cost of investigation. VE programs should promote the use of VE but minimize the chance of money being wasted on unnecessary, unsuccessful, or inappropriate VE reviews. [Ref. 16, p. 3]

## B. REPORTS BY THE DOD INSPECTOR GENERAL

The three audits summarized in this section were conducted by DODIG at the request of the Under Secretary of Defense for Acquisition and Technology (USD A&T). USD A&T requested the audits in accordance with requirements included in the May 1993 revision of OMB Circular A-131. The audit objectives were to determine whether DOD VE policies, procedures, and implementation of the revised OMB Circular A-131 were adequate and whether agency reported VE savings were valid. The auditors also assessed how extensively the VE program was included in contracts, whether contractors

believed they were encouraged to participate in the VE program, and how VE related to other streamlining or savings initiatives.

Two of the audits summarized in this section were performed on different Federal agencies, the Defense Logistics Agency (DLA) and the U. S. Navy. The third report was a summary audit report on all DOD VE programs.

"Defense Logistics Agency Value Engineering Program," DODIG Report (97-003, October 1996)

DODIG made two major findings in their audit of DLA's VE program: (1) validity of reported VE savings and costs were inaccurate; and (2) contractor participation in the VE program was not promoted and tracked.

The first of these findings was that DLA incorrectly reported savings and costs for non-VE cost-reduction initiatives as VE savings and investment costs. DLA also understated its costs related to VE and the other cost-reduction initiatives at the three buying centers that were reviewed. The three buying centers that were reviewed by DODIG were the Defense General Supply Center (DGSC), Defense Industrial Supply Center (DISC), and the Defense Personnel Support Center (DPSC). DODIG found that the reporting inaccuracies occurred because:

(1) USD A&T and DLA guidance did not clearly define VE or differentiate VE from other cost reduction initiatives;

(2) DLA guidelines did not provide for the accumulation of costs outside the VE offices at the buying centers; and

(3) DLA managers at the three buying centers, DLA Headquarters, and the Office of the Assistant Secretary of Defense (Economic Security) did not thoroughly review the basis and the accuracy of calculations for savings claimed. [Ref. 17, p. 4]

Of the 130 projects reviewed, with savings valued at $19 million that DLA reported during fiscal year 1994, 120 projects, valued at $15.7 million, were based on competition and other non-VE cost-reduction initiatives. Of the $3.3 million of savings reported for the ten projects that were VE, $2 million was either overstated or not supported by sufficient documentation. [Ref. 17, p. 4]

The second finding in this DODIG report was that the Defense Contract Management Command (DCMC) did not actively promote and track Defense contractor VE programs, did not review contracts for VE incentive clauses, and did not report any VE accomplishments during fiscal year 1994. DODIG found that these conditions occurred because:

(1) DCMC officials considered VE a low priority and the responsibility of DOD program offices;

(2) DCMC did not consistently follow the requirements of DLA Directive 5000.4, "Contract Management," Part VI, Chapter 13, "Value Engineering"; and

(3) Contracting Officers responsible for contracts at DPSC did not provide adequate oversight to ensure that VE incentive clauses are included in the contracts. [Ref. 17, p. 16]

DODIG found that these conditions contributed to contractor reluctance to submit VECPs and in lost opportunities to reduce DOD procurement and maintenance costs for DOD acquisition programs [Ref. 17, p. 16].

"The Navy Value Engineering Program," DODIG Report (97-121, April 1997)

DODIG made findings similar in its audit of the Navy's VE program as those found in the audit of DLA's VE program. The two major findings were: (1) inaccurate reporting of VE savings and costs; and (2) poor implementation of VE in the Navy.

The auditors found that the Navy had problems similar to DLA when reporting and tracking VE program savings and costs. Of the 85 proposals reviewed, the Navy reported savings valued at $130.5 million during fiscal year 1994. Twenty-six of those proposals value at $59.8 million were based on other non-VE cost-reduction initiatives. There were 59 proposals reported with savings of $70.7 million that were VE, however $42.2 million were overstated, or not supported by sufficient documentation. [Ref. 14, p. 5) The reporting inaccuracies occurred because DOD and Navy guidance did not:

(1) Clearly define and differentiate VE from other cost-reduction initiatives; and

(2) Clearly explain how to compute and report savings and costs in accordance with the revised OMB Circular A-131. [Ref. 14, p. 5]

Also, Navy managers did not thoroughly review the basis and accuracy of calculations for claimed VE savings. As a result, the reported savings and cost data for Navy VE efforts were not reliable for assessing program effectiveness. [Ref. 14, p. 5]

The auditors found that DOD and the Navy have not clearly differentiated VE savings from savings generated through other cost-reduction initiatives. Also, the report stated the Navy could improve methods of reporting VE savings and costs. Until savings and related investment costs are accurately reported it will be difficult to assess VE program effectiveness. [Ref. 14, p. 13]

The second finding in this DODIG report was that the Navy did not make effective use of VE to reduce costs on many of its acquisition programs, as evidenced by reported VE savings and costs. [Ref. 14, p. 16] The Navy reported VE savings on only two MDAPs during fiscal years 1994 and 1995, although the Navy had 36 and 30 Category 1D and 1C MDAPs during that period. [Ref. 14, p. 16] In other words, the

Navy garnered VE savings in only three percent of MDAPs in fiscal years 1994 and 1995.

Naval Sea Systems Command (NAVSEA) and Naval Air Systems Command (NAVAIR) program officials considered VE a low priority [Ref. 14, p. 17]. The DODIG auditors selected four NAVSEA MDAPs and one NAVAIR MDAP that did not have VE savings reported during fiscal year 1994. The program officials for:

(1) Four MDAPs stated they used other cost-reduction initiatives to control costs;

(2) Two MDAPs stated that sufficient funding was not available to implement recommended changes;

(3) Two MDAPs stated the program was in the design phase and improvements made during the design phase were not readily quantifiable;

(4) Five MDAPs did not have any formal plans to use or promote VE; and

(5) One MDAP stated that NAVSEA did not encourage contractors to submit VECPs. [Ref. 14, p. 18]

DODIG also interviewed contractors as part of their audit of the Navy's VE program. The interviews revealed that Navy contractors viewed VE as a low priority within the Navy [Ref. 14, p. 18]. Seven prime contractors for one or more Navy MDAPs were interviewed. Officials for:

(1) Five contractors stated that NAVSEA did not have a VE manager or point of contact who could respond to their questions and that they did not believe NAVSEA was interested in contractor participation in VE;

(2) Three contractors stated that VECP proposals were implemented and funded as normal engineering change proposals by NAVAIR, NAVSEA, and the AEGIS Program Office;

(3) Two contractors stated that participation would improve if the Navy would review and approve VECPs in a more timely manner; and

(4) One contractor stated that VE was a good cost saving measure but did not believe NAVSEA really understood the potential benefits of VE. [Ref. 14, p. 18]

DODIG auditors asserted that additional emphasis of VE by Navy program offices would result in increased contractor participation in the Navy VE program and associated reductions in acquisition and maintenance costs. [Ref. 14, p. 18]

"Summary Audit Report On DOD Value Engineering Programs," (DODIG Report 97-209, August, 1997)

This report presents the results of an audit jointly performed by the DODIG, and the Military Department Audit Agencies of the VE programs in the Military Departments and DLA.

The results presented in this summary report reiterate the findings in the previously discussed DODIG and GAO audit reports. The two major findings in this audit report were: (1) a lack of management emphasis and support of the VE program which resulted in infrequent contractor participation in the VE program; and (2) the improper tracking and reporting of savings and costs from using VE.

The DODIG summary report established that although each of the Military Departments and DLA reported significant savings for VE during fiscal years 1994 and 1995, opportunities existed to expand the use of VE techniques for DOD and contractor programs and projects. Many DOD activities and contractors were either not using or were making limited use of VE. [Ref. 13, p. 4] The savings reported by DOD from VEPs and VECPs accounted for less than one percent of Total Obligation Authority (TOA) during fiscal years 1994 and 1995. In fact, the reported savings were only 0.3 percent of TOA during each period versus a goal of one percent. [Ref. 13, p. 4]

Also, many MDAPs did not have any reported VE savings during fiscal years 1994 and 1995. In fiscal year 1994 only 14 of 79 MDAPs reported any savings as a result of VE and in fiscal year 1995 only 16 of 82 MDAPs reported savings. [Ref. 13, p. 5]

In their second major finding in this report, DODIG auditors stated that the Military Departments and DLA did not properly track and report savings and costs for using VE. Also, savings related to other cost reductions were included in VE savings reported by some organizations. [Ref. 13, p. 11] This condition occurred because:

(1) guidance did not clearly define VE or differentiate VE form other cost-reduction initiatives, and

(2) management controls did not require positive confirmation that the activity officials verified the accuracy of reported savings. [Ref. 13, p. 11]

DODIG recommended in the summary report that additional guidance and emphasis is provided to improve the accuracy and completeness of reported data. Also, management controls over the collection and reporting of VE savings and cost data at DOD activities require improvement. [Ref. 13, p. 13]

## C. FINAL REPORT OF THE PROCESS ACTION TEAM ON VECPS

The Principal Deputy Under Secretary of Defense for Acquisition and Technology, PDUSD(A&T), chartered the DOD Value Engineering Change Proposal Process Action Team (PAT). The PAT issued the final report of findings and recommendations in July 1997. The PAT's mission was to:

(1) Define the role of the VECP in today's acquisition environment;

(2) Identify Program Manager and contractor barriers to VECPs;

(3) Develop an action plan to remove or minimize those barriers thereby increasing VECP savings; [Ref. 1, p. x]

The objectives of the PAT were to identify and remove the impediments to the VECP and thereby improve the incentives for contractors to identify life cycle cost savings opportunities for the Government.

The VECP PAT found that resolution of the following barriers was key to the continued effectiveness of the VECP. [Ref. 1, p. xi]

1. From the Program Manager's viewpoint.

   A. The VECP process is too lengthy, complex and resource intensive.

   B. The VECP puts a funding burden on the PM by requiring that they fund the implementation costs and the contractor's share of collateral savings. This burden has deterred Program Managers from aggressively supporting the VE program.

   C. There is little motivation for the PM to aggressively pursue the VECP because any savings are taken from his future budget.

   D. For most programs, cost reduction has not been made a program requirement.

   E. Lack of top-level management attention to the VECP decreases PM attention to the program.

2. From the Contractor's viewpoint:

   A. The PM's negative attitude toward the VECP overshadows the current limited incentives for submitting a VECP.

   B. Contractors view the VECP as a high-risk investment, which often has insufficient return on investment to justify their initial investment.

   C. The excessive complexity of the VECP process consumes resources, delays payment, and decreases the opportunity for significant return on investment.

   D. The Federal Acquisition Regulations and other VE guidelines are perceived as inflexible and too restrictive in their incentive guidelines.

3. From the Supply Support Perspective:

A. Most supply/support purchases are too small (less than $25K) to support investment in VECP development.

B. Many supply/support contractors have engineering capability that is too limited to support development of VECPs.

C. The length and complexity of the process deters VECP development and submission.

The VE PAT proposed the following recommendations and associated actions to reduce the barriers found in the VECP process. [Ref. 1, p. xii]

1. Increase senior level management emphasis on VE. Request that the USD(A&T) send a memorandum to the Component Acquisition Executives (CAEs) promoting the VECP, identifying the actions necessary to stimulate its use, streamline the VECP process, improve the incentives, and provide for VECP funding. Components should appoint the VECP advocates necessary to facilitate program implementation.

2. Simplify and Shorten the VECP Approval Process. Empower the Integrated Process Teams (IPTs) to expedite the VECP approval process. Give the program level Cost Performance IPT management responsibility to establish goals, set suspenses, task and motivate lower level IPTs to review, approve and negotiate settlement on VECPs in a timely manner. The Procuring Contracting Officer (PCO) will, of course, remain the final approval authority for contract modifications. Components should establish aggressive goals for the average processing time of a VECP, as measured from formal submission to implementing contract action, and should staff, empower and motivate IPTs to meet these goals.

3. Quickly communicate, through a guidance memorandum or other appropriate mechanism, the acceptability of using the Undefinitized Contract Action (UCA) to allow VECP implementation to begin immediately after technical approval when the following conditions apply:

    - the contractor guarantees a minimum savings, and

    - there is a cap on the implementation cost to the Government.

4. Provide a Funding Source. Modify the scope of the Reliability, Maintainability and Supportability (RM&S) Program to encompass the funding of VECPs. Ensure the fund is self-replenishing in nature and provides adequate funds to cover implementation costs and the contractor's collateral savings share, both of which are now a funding burden to the PM. Ensure that implementation provides the funds in a timely manner so as to preclude extended delays in the VECP processing, approval, and implementation time.

5. Process the Army proposed FAR Revision. Modify the FAR to give the PCO the flexibility to increase the contractor savings share from 50% to 75%, to extend the

sharing period from 3 to 5 years, and to raise the contractor collateral savings share from 20% to 100% of an average year's savings.

6. Process the Industry Proposed FAR Revision. Modify the FAR to include the provisions of the Industry-proposed FAR revision and to include a provision to base sharing on quantities rather than time. These changes clarify the regulation, relax existing constraints, and expand the applicability of VE.

7. Improve VECP Education and Training.

   (a) Develop a training module for the Program Managers' Course, PMT 302. This training should address VE's role in cost reduction, IPT management of VECP processes, sources of implementation funds, means for motivating VECP submission and approaches to establishing a win-win business agreement with the contractor.

   (b) Incorporate material in PMT 302 including best practices, lessons learned, and recommended VECP strategies into the Defense Acquisition Deskbook and a VE Home Page on the Internet.

   (c) Update Defense Acquisition Workforce Improvement Act (DAWIA) VE Training Per OMB Circular A-131. Task the DAWIA Functional Boards to develop Terminal Learning Objectives (TLOs) for VE and to develop and integrate VE material into applicable courses. [Ref. 1, p. xiii]

## D. SUMMARY

This chapter has reviewed reports by the GAO, the DODIG and the VECP PAT pertaining to the DOD VE program. The following list of findings summarizes the reports by these agencies:

(1) There is a consistent lack of top management support of the DOD VE program;

(2) There is inaccurate collection, reporting, and documentation of VE program savings;

(3) The VECP submission and approval process is much too lengthy and cumbersome;

(4) Insufficient funding is available to encourage and support contractor submission of VECPs thereby decreasing contractor participation in the DOD VE program;

(5) An insufficient number of DOD acquisition personnel are assigned to encourage, promote, and support contractor VECP submittals;

(6) VECP submission is a high-risk investment for the contractor that offers insufficient return to be attractive;

(7) There is a low level of VE knowledge among DOD acquisition personnel which results in reduced contractor VECP submittals.

The findings of these Government audits and reports will form the basis of interviews with DOD acquisition personnel and Defense contractor acquisition employees that will be presented in the next chapter. The purpose of Chapter IV is to further investigate the existing barriers to more active contractor participation in the VE program by questioning defense acquisition professionals.

# IV. SURVEY RESULTS

## A. INTRODUCTION

The data presented in this chapter were gathered through a telephone survey of 30 acquisition professionals from various DOD activities and defense contractor organizations. The respondents included military and civilian personnel from the Army, Air Force, Navy, and DLA activities as well as several different defense contractors including Bell, Boeing, and Rockwell-Collins. Each survey was conducted by telephone and lasted approximately 40 minutes. All Government respondents were at least at the GS-12 level and the average acquisition experience for the contractor respondents exceeded 20 years.

As many of the questions asked of the respondents could reveal significant discrepancies in their own organizations, the respondents were encouraged to answer freely on a non-attribution basis. A listing of all respondents is presented in Appendix B.

The survey was designed to determine what barriers exist that prevent or discourage more active contractor participation in the DOD VE program. The survey was also intended to determine what effect recent changes to DOD VE program guidance have had on contractor participation in VE, and whether other improvements can be made which would increase contractor participation in the VE program. Central to the study is the assumption that these managers are best able to determine the current status and adequacy of the existing system. This assumption is based upon the fact that VE program guidance is applicable across all the DOD services and activities.

The researcher, based upon the literature review conducted in Chapter III, developed the interview questions. The questions were designed to determine whether the barriers identified during the literature review are still applicable to the current DOD VE program. Also, many of the barriers revealed during the literature review have been identified as problems since the initial audit of the VE program and the questions are intended to reveal whether the same problems continue to exist.

The survey consisted of 15 questions, and the respondents were encouraged to elaborate on any response. The survey was not intended to be a statistically significant sampling of responses, but rather a collection of opinions from the experts in the field of Defense acquisition and VE.

## B. THE RESPONSES

### 1. Question One

**What are the barriers to more active contractor participation in the DOD VE Program?**

#### *a. Government Responses*

**Data Presentation and Discussion:** The purpose of this question was to determine what the barriers to more active contractor participation in VE are according to the respondents. The Government acquisition professionals interviewed identified many barriers to more active contractor participation in the DOD VE program. There were three barriers that were most commonly mentioned by the respondents. These were:

1) The perception held by contractors that DOD Program Managers do not desire VECP submittals. Several respondents stated that Program Managers actually discouraged contractors from submitting VECPs.

2) The VECP submission and approval process is lengthy and cumbersome. The VECP process requires a large commitment of time and resources by the contractor with no guarantee of success.

3) Lower production quantities and unstable funding for defense procurement programs provided fewer opportunities for contractors to submit VECPs.

Several other barriers were cited during the interviews, including: the lack of dedicated Government personnel needed to manage and promote VE; a low level of awareness of the VE program among Government personnel; and competition between VE and other cost saving initiatives such as Cost as an Independent Variable (CAIV) and the Modernization through Spares program. Some typical comments received are paraphrased below:

> The most crucial barrier to more active contractor participation in the VE program is the contractor's perception that VECPs are an irritant to the customer. If the Program Manager does not want VECPs, the contractor will not risk damaging their relationship with the Government by submitting unwanted VECPs.
>
> The Program Manager often does not have a clear understanding of what the VE program can do for their program. Often a Program Manager will only consider using VE when their program is at risk of going over budget.
>
> The VECP submission and approval process takes too long and is too cumbersome. The process often takes up to six months or a year to complete.
>
> If the Program Manager is pro-VE they will find a way to make VE happen. If the Program Manager is hostile or anti-VE, the VECPs submitted will go nowhere.
>
> The biggest barrier is awareness. There is a lot of ignorance concerning what VE is and its purpose. If there is no awareness of the VE program there will be little encouragement and maybe even some fear of the process.
>
> In today's procurement environment the Department of Defense is not buying as much as we were ten or fifteen years ago. There is less financial incentive for the contractor to submit VECPs because the payoff is not sufficiently attractive.

*b. Contractor Responses*

**Data Presentation and Discussion:** The majority of the contractors interviewed cited the Government's lack of interest in the VE program as a major barrier. If the customer does not want VECPs, the contractor will not spend time and money generating them. Also, many contractors considered insufficient funds available to the Program Manager to use for VECPs a barrier. Additional comments received were:

> There is a long-standing mindset about VECPs among contractors. Contractors have the perception that the Government's Program Managers do not like VECPs because they feel it is a give-away program. The Program Managers feel that the contractor did not do the job right the first time.
>
> VECPs submitted by the contractor take much too long to get implemented. This discourages the contractor from future submissions because they perceive it is not a priority with the customer.
>
> VECPs are not well received from the customer end. VECPs are not well received by the Program Offices because they often have a negative financial impact on the instant contract. Even though the VECP may save money in the long run. This lack of interest on the part of the Government discourages future submissions by the contractor.

*c. Analysis:* A comparison of Government and contractor responses reveals that both Government and contractor respondents believe similar barriers prevent more active contractor participation in the DOD VE program. Government and contractor respondents identified several similar barriers. The major barrier identified by interview respondents from the Government and contractor side was the lack of support for the VE program within DOD. The literature review performed earlier in this research effort indicated that the general level of support for VE within DOD was low. Both Government and contractor respondents confirmed that support for VE continues to be weak. Reasons for the lack of support for VE within DOD may be revealed by the other

barriers identified during the telephone interviews, especially a lack of funding for VECPs and the cumbersome, time consuming VECP submission and approval process.

Based on the literature review, the researcher anticipated the respondents would identify at least three major barriers. Both sets of respondents did most commonly identify the same three barriers. The three barriers are a lack of VE support within DOD, lack of funding and the difficult VECP submission and approval process. The researcher will address these three barriers in the following paragraphs.

The numerous cost saving initiatives currently sweeping through DOD as a part of acquisition reform are the main reason for the current lack of support. The initiatives limit the amount of support available for top-level DOD management to devote to VE. Also, the multitude of cost saving initiatives that are currently popular have created confusion among acquisition personnel and increased the difficulty for acquisition workforce members to clearly distinguish between VE and other cost reduction programs. The tendency for Program Managers to remove VE clauses from their contracts is an example of the minimal support for VE within DOD. This activity was mentioned during a number of the telephone interviews as a common practice in some DOD agencies. The researcher believes the tendency for Program Managers to remove the VE contract clause indicates a lack of understanding of the VE program among Program Managers and a high level of frustration with the VE process that in turn discourages the use of VE.

The researcher expected the lack of funding for VECPs to be identified as a barrier to more active contractor participation in VE. As Program Managers have their budgets squeezed by smaller total Defense budgets and demanding comptrollers, savings produced by a VECP can result in a further reduction in the program budget, as

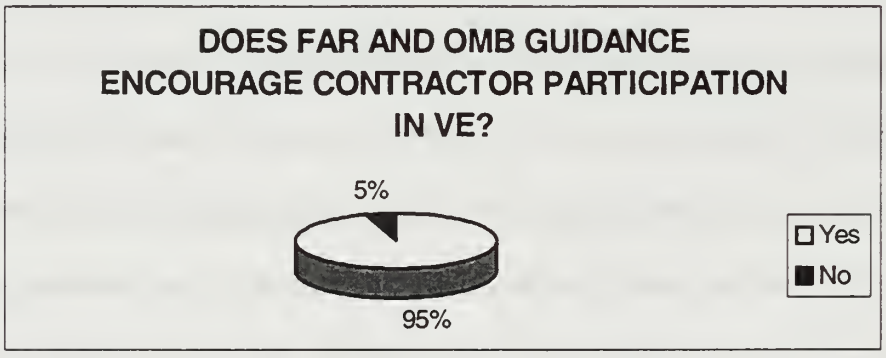
comptrollers tend to deduct expected VECP savings from the future year's budget. The investment of resources by the Program Manager necessary to navigate the VECP process can actually result in their program being penalized by a funding cut.

The VECP process was also identified during the literature review as a potential barrier to more active contractor participation in VE. Described as cumbersome, complex, and demanding in the literature, the researcher also expected the respondents to identify the VECP process as a problem. In fact, both Government and contractor personnel identified the VECP process as a barrier. In the opinion of the researcher the current process takes too long to complete and could be streamlined to improve VE results.

### 2. Question Two

**Do the VE regulations provided in the FAR and OMB Circular A-131 encourage contractor participation in the VE Program?**

#### *a. Government Responses*



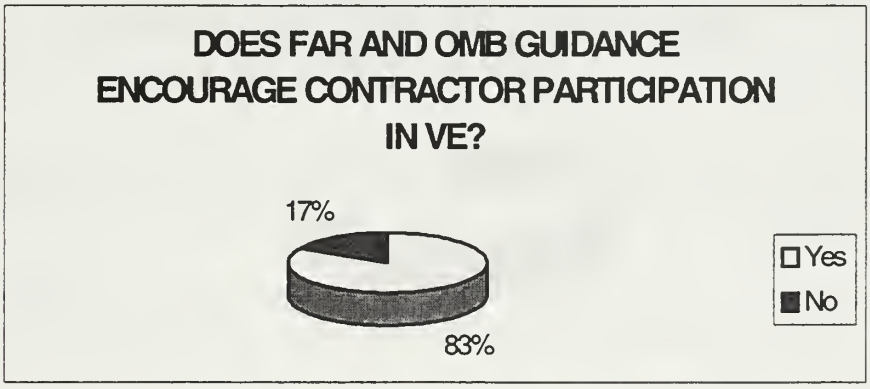

| | |
|---|---|
| Yes: | 95% |
| No: | 5% |
| Undecided | 0% |

**Data Presentation and Discussion:** This question was designed to determine whether contractors are encouraged to participate in VE as a result of the guidance and regulations provided by the Government. A clear majority of the

respondents believed that the FAR and OMB regulations that govern contractor participation in VE help to encourage their participation. Most of the respondents felt that in order to get increased VECP submissions by contractors, the contractors must have a reasonable expectation of making a profit. The majority of the respondents deemed the inclusion of a sharing arrangement that allows contractors to gain financial benefit from their suggestions as crucial to the program. Presented below are some paraphrased comments in response to this question:

> The regulation in FAR Part 48 provides a financial incentive for the contractor to participate in VE. The contractor has the opportunity to share savings from an approved VECP with the Government.
>
> FAR and OMB guidance indirectly encourage contractors to participate in DOD's VE program. The regulations provide the guidance necessary to execute the program.
>
> In the late 50's and early 60's there was no incentive for the contractor to participate in VE. It was a bad business decision. DOD introduced sharing ratios to provide encouragement to the contractor to submit VECPs.
>
> The regulations do not encourage or discourage contractor participation in VE. People have to encourage the contractor to submit VECPs. The contractor will work on what the Program Manager deems important.

***b. Contractor Responses***




| | |
|---|---|
| Yes: | 83% |
| No: | 17% |
| Undecided: | 0% |

**Data Presentation and Discussion:** A clear majority of the contractors interviewed felt the guidance in the FAR and in OMB Circular A-131 provided financial incentives to the contractor. The contractors also stated these financial incentives did encourage contractor participation in the VE program. More of the contractor respondents than the Government respondents felt that other problems with the VE program prevented more active contractor participation in VE. Typical responses are paraphrased below:

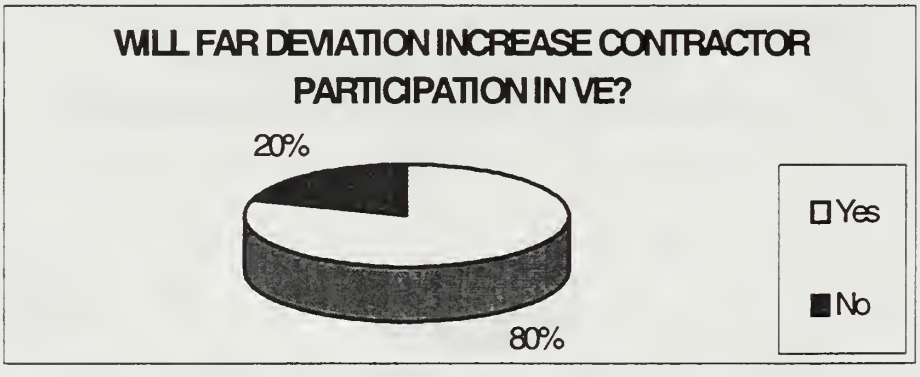
> The regulations do help to encourage the contractor to submit VECPs. They provide the necessary financial incentive needed for the contractor to consider making the up-front investment.
>
> The FAR helps but we do not pay much attention to the OMB Circular A-131. Other problems exist which prevent greater contractor participation in the VE program.

Analysis of question two will be presented in part c. of question three.

### 3. Question Three

**Will the recent change to the FAR VE guidance that raises available savings sharing percentages and allows increased savings sharing time periods encourage greater contractor participation in VE? Why? Why not?**

#### *a. Government Responses*

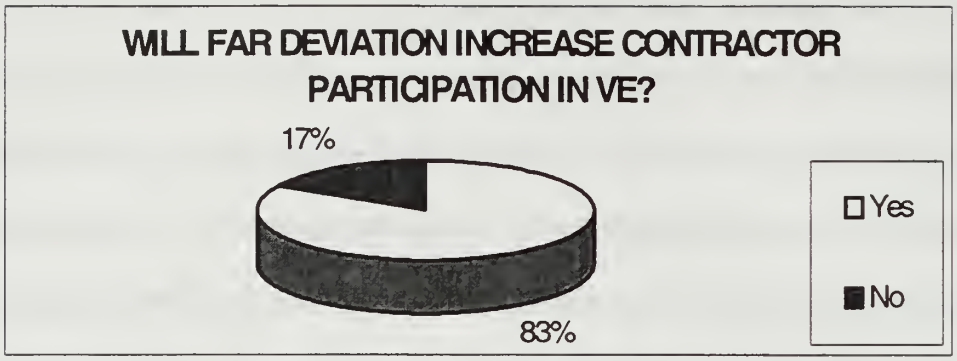



| | |
|---|---|
| Yes: | 80% |
| No: | 20% |
| Undecided: | 0% |

**Data Presentation and Discussion:** The purpose of the FAR Part 48 deviation is to encourage more contractor participation in VE. Question Three was designed to solicit the opinions of acquisition professionals as to the FAR deviation's effectiveness. Eighty percent of the Government personnel interviewed believed that the FAR deviation issued by the Director of Defense Procurement will increase contractor participation in VE. Many of the respondents felt that with fewer DOD acquisition programs and decreasing production quantities, the contractor needed a greater percentage of the savings to remain interested in VE. The majority of respondents felt that the FAR deviation was a step in the right direction, but that this action alone would not significantly increase contractor participation in VE. Additional comments are paraphrased below:

> I give this question a qualified yes. It is a qualified yes because the FAR deviation is a motivating factor, but this alone will not fix VE.
>
> We have seen an increase in VE submissions since the release of the FAR deviation. Communication of the new guidance is vital. Contractors need to be informed of the new regulations.
>
> The change has been on the street for awhile and we have seen no dramatic increases in VECP submission rates.
>
> The FAR deviation is important because it creates the possibility of more money in the pocket of the contractor. The changes make a better business equation for the contractor.
>
> In theory the FAR deviation will increase contractor participation, but without an increased level of confidence in industry that their investment will be profitable there will not be an increase in VECP submissions.
>
> Yes, the FAR deviation should result in increased contractor participation in VE, but VE must have the Program Managers support or no increase will result.

*b. Contractor Responses*




| | |
|---|---|
| Yes: | 83% |
| No: | 17% |
| Undecided: | 0% |

**Data Presentation and Discussion:** The contractors' representatives were decidedly supportive of the recently released FAR deviation. Many of the respondents thought the FAR deviation was beneficial because the change has the potential to increase return on investment for the contractor and also benefit the Government. Additional comments are paraphrased below:

> It is beneficial to the extent that it provides a better business case for submitting VECPs. VECPs have become more attractive because of the greater potential for financial benefit. It is one of the best things that the Government has done for VE in the last several years.
>
> Yes, the FAR deviation should improve VECP submittals. This change makes a big difference in the decision to go forward with or terminate a proposal. VECPs are now easier to sell internally.
>
> The change will help, but the Government's buying activities must be encouraged to accept VECPs or the present situation will remain unchanged.
>
> The return potential for a contractor that submits a VECP is greater, but the existing blocks that prevent participation must still be removed.

*c. **Analysis:*** In order to obtain VECPs from contractors, the Government must permit the contractor to benefit from their investment of resources. FAR Part 48

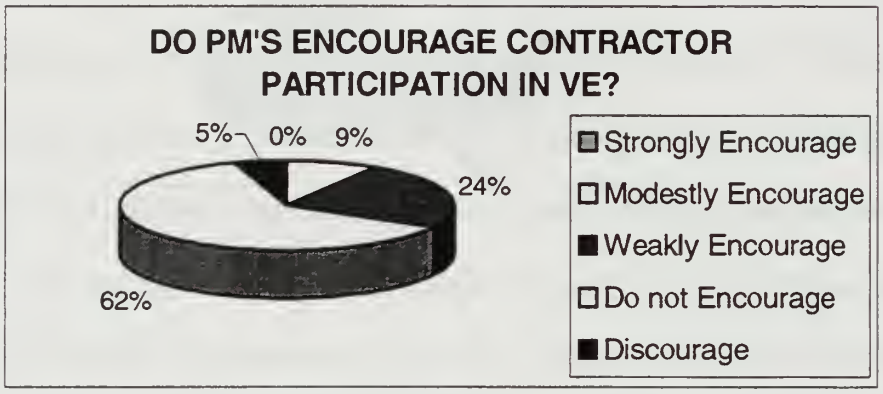
and the FAR deviation issued by the Director of Defense Procurement provide the financial incentives necessary to enable the contractor to profit from their investment of time and money. Often, the contractor must make an expensive, up-front investment to develop, test, and prepare a VECP. The contractor will take none of these actions if they believe there is little chance to obtain some financial benefit or the risk of financial loss is too high. The contractor will choose to use their resources on other projects. The researcher believes the Government is moving in the right direction by increasing the financial rewards for the contractor that submits and obtains approval for a VECP. The Government also benefits from the resulting contract change or VECP. The Government can benefit by obtaining reduced manufacturing cost, product improvement, the integration of more modern technology, or reduced product life-cycle costs as the result of a successful VECP. The business equation must remain attractive to the contractor or VECP submissions will no longer continue.

A comparison of the Government and contractor responses to questions two and three indicate both believe the financial benefits available through FAR Part 48 are crucial to the success of the VE program. The small percentage of respondents that indicated the FAR Part 48 and the FAR deviation would not increase contractor participation believe other measures must also be taken in conjunction with the financial incentives. The researcher agrees that the offer of financial benefit alone will not substantially increase VECP submittals. Other actions must be taken by DOD leadership to decrease the many barriers identified in this research effort in order to gain any significant change in the rate of VECP submissions.

### 4. Question Four

**To what degree do DOD Program Managers encourage contractor participation in the DOD VE Program? Why? Why not?**

*a. Government Responses*



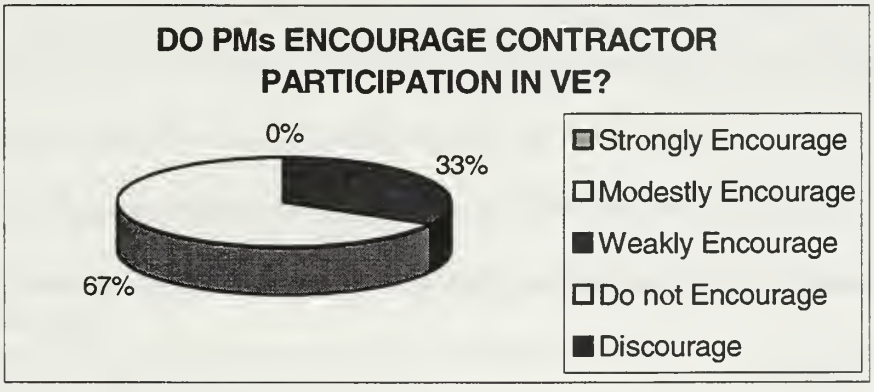

| | |
|---|---|
| Strongly Encourage: | 0% |
| Modestly Encourage: | 9% |
| Weakly Encourage: | 24% |
| Do not Encourage: | 62% |
| Discourage: | 5% |

**Data Presentation and Discussion:** In the literature review conducted in Chapter Three of this research effort, Program Manager support for the VE program surfaced as a potential barrier to more active contractor participation in VE. The purpose of this question was to solicit the opinions of acquisition professionals concerning Program Manager support for VE. The primary reason that 67% of the Government acquisition professionals believe that Program Managers do not encourage or discourage contractors from participating in VE is the lack of incentives for the Program Manager to encourage contractor participation in VE. Many of those questioned believed that Program Managers would only resort to the use of VE if their program were in financial trouble and in need of program savings. Several respondents stated that there was a large variation in support of VE among Program Managers. Some Program Managers were

highly supportive of the VE program and some refused to use VE at all. A few respondents cited examples in which Program Managers took action to remove the VE clause from their contracts. Additional comments are paraphrased below:

> The Program Manager must be incentivized to produce cost savings in their program. Otherwise there will be little desire on the part of the Program Manager to encourage VE.
>
> The Program Managers are not supporting the VE program at all. This is the single biggest problem with the program. The Program Managers need a push from the Program Executive Officers to encourage VE.
>
> Many Program Managers are ignorant of the VE option. Program Managers are overloaded during their training process and receive little training or information about the VE program.
>
> If a program is at risk, then the Program Manager may be inclined to encourage the contractor to use VE. If a program is not at risk there is no incentive for the Program Manager to encourage VE.
>
> Program Managers have little incentive to encourage the contractor to use VE. Even if the Program Manager does make VE a priority and achieves cost savings, comptrollers may take the savings away from the program. This situation creates a negative incentive to participate in VE.

***b. Contractor Responses***




| | |
|---|---|
| Strongly Encourage: | 0% |
| Modestly Encourage: | 0% |
| Weakly Encourage: | 33% |
| Do not Encourage: | 67% |
| Discourage: | 0% |

**Data Presentation and Discussion:** The majority of the respondents stated that Program Managers did not encourage contractor participation in VE. Many contractors cited a lack of awareness of the VE program among Program Managers as a reason that VE did not receive more attention. Additional comments are paraphrased below:

> Encouragement to participate in VE depends largely on the individual Program Manager. Some are supportive and others are very against VE. Some Program Managers will even work to circumvent the requirement to place a VE clause in the contract.
>
> Many Program Managers are not familiar with the VE program and VECPs. There will not be any encouragement to participate if the Program Manager is unaware of the opportunities presented by VE.
>
> Encouragement depends largely on the Program Managers perspective toward VE. I would say encouragement is relatively low. Contractors do not hear Program Managers asking the question, "Why haven't you submitted any VECPs?"
>
> The degree of encouragement from Program Managers varies greatly over the entire range, from very supportive to not supportive at all. Many Program Managers view VECPs as an annoyance.
>
> The bottom line is the contractor will place importance on the same items that are important to the Program Manager. Often, since VE is not a priority to the Program Manager, VE is not a priority to the contractor.

*c. **Analysis:*** The researcher confirmed a lack of support for the VE program among DOD Program Managers during the telephone interviews. A comparison of Government and contractor responses found that both sets of respondents believe Program Managers provide little support to the DOD VE program. In the opinion of the researcher, Program Managers do not support VE for three reasons. The three reasons are VE introduces risk into their program, demands dedication of limited personnel and financial resources, and may result in program funding decreases.

VE introduces risk into programs by requiring a change in procedures, materials or processes. The production schedule may need to be altered, new materials tested or purchased, or different production equipment acquired. A program that is on-schedule and under cost does not need the cost savings or product improvement available through VECPs. There is little incentive for the Program Manager to risk investment in a VECP.

The VECP submission and approval process demands an investment of time and energy from key members of the program staff. A Program Manager must decide how to best allocate and capitalize on the limited number of available program team members. This decision can cause higher priority items to take precedence over VECPs. VECPs become an extra requirement and are placed on the bottom of the priority list.

Finally, the reward for the Program Manager that locates and invests the resources necessary to adopt and implement a VECP may be a program funding decrease. The researcher found that comptrollers often deduct the expected future savings from the future years program budget. The impact of this type of action on the Program Manager is predictable; there will be less enthusiasm for the VE program and a greater tendency to look at other options for program improvement. No Program Manager wants their budget reduced and approved VECPs can lead to budget cuts.

### 5. Question Five

**What actions could be taken by the DOD to increase contractor participation in the VE program?**

#### *a. Government Responses*

**Data Presentation and Discussion:** This question was intended to encourage all respondents to provide recommendations for improving the participation of contractors in VE. There were numerous recommendations for improving contractor

participation in the VE program. Thirty-one percent of the respondents recommended the establishment of a separate funding source that would allow Program Managers to fund VECPs without regard to financial impact on their own program. Twenty-three percent believed that increasing awareness and education among contractors and Government personnel would result in more frequent contractor participation in VE. Eighteen percent of the respondents recommended more visible Government support of the VE program. Many viewed the present level of support as insufficient and stated that more dramatic support would produce increased VECP submissions. An example cited during the interviews was a recent DOD/Industry VE conference that was sponsored by DOD. The principal DOD speaker failed to show. Many respondents believed that this was an example of the typical lack of support within DOD for the VE program. Other recommendations included establishing more effective metrics to track VECP submission rates, and improving the VECP submission and approval process. Some of the recommendations are paraphrased below:

> A centrally managed fund that could be drawn upon by DOD Program Managers would dramatically increase the number of VECP submissions. Contractors would know the money was out there and work to get a share of it.
>
> A revolving fund account that is centrally managed would have a dramatic impact. This idea would work especially well if a portion of the Government cost savings stayed with the Program Manager to use to improve their program and the remaining portion went back into the fund to keep it solvent.
>
> The VE program needs to be sold more. We need to have a cadre of trained VE experts in the field conducting training and raising the level of awareness of Government and contractor personnel.
>
> Top-level management support from the heads of the Services and DOD is needed. The real big wigs need to stand up and say, look at this program. This is a great program and I want everyone to participate. Support would

also encourage industry and place more emphasis on the VE program at the lower Government levels so they would get necessary resources and do a better job of working with the contractor.

*b. Contractor Responses*

**Data Presentation and Discussion:** Contractor personnel interviewed also had several suggestions on ways to improve their participation in the VE program. Forty-five percent recommended the establishment of a funding pool that could be used to help defray up-front costs. The up-front costs are presently the sole responsibility of the contractor. Twenty-two percent of the respondents believe improvements to the VECP submission and approval process would result in improvements to contractor participation in VE. Twenty-two percent also thought that an increased use of metrics to track DOD's use of VE would increase contractor participation. Finally, eleven percent of the contractor respondents recommended increased management support of the VE program. The respondents believed increased DOD management support would encourage contractors to spend the time and effort necessary to develop VECPs. Some of the comments received are paraphrased below:

> A separate funding pool available to the Program Manager would increase contractor submittals of VECPs. Also, improvement of the presently cumbersome VECP process would stimulate VE activity.
>
> Make VECPs a measured performance criterion for the Government's Program Manager. Some activities are starting to do this and it is working.
>
> Incentivize the Government's Program Manager to accept VECPs. If the Program Manager were awarded for acceptance and approval of VECPs, we would see more VE activity.
>
> Streamlining the VECP process, which often takes from six months to a year to complete, is important. Cutting down the time it takes to approve and implement a VECP would benefit the contractor and the Government.

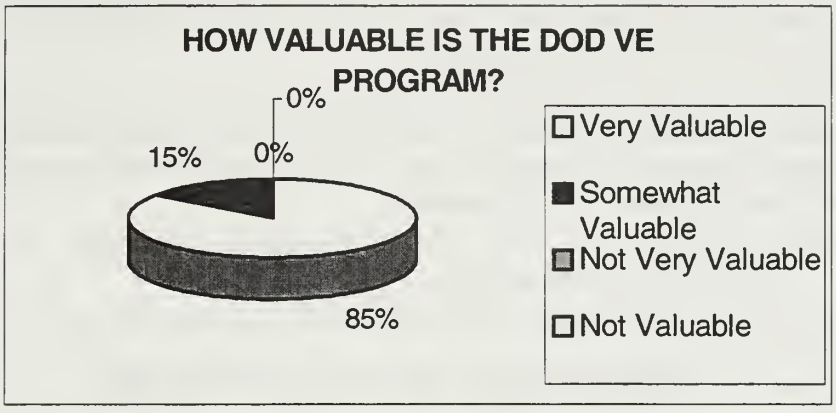
*c. **Analysis:*** There were several parallels between the Government and contractor responses to question five. The researcher expected differing opinions from both parties because of the dissimilar objectives of both parties, but the majority of recommendations were very much alike. A comparison of Government and contractor responses revealed that the establishment of a separate funding source for VECPs was the most appropriate action DOD could take to encourage more contractor participation in VE. The researcher anticipated Government respondents would suggest establishment of a separate VE funding source. The fact that contractors also recommended this action was a surprise to the researcher. As a result of the literature review, the researcher anticipated that contractors would most likely prefer a larger share of the financial benefit from an approved VECP, but not the creation of a separate funding pool. The fact that both the Government and contractor respondents indicated that the establishment of a separate VE fund is the most significant change that could be made emphasizes the current VECP funding problem. The researcher found that Program Managers are reluctant or unable to locate financing for the submitted VECPs. Without the establishment of a dedicated funding source it is unlikely that VECP submissions or approvals will increase.

Many of the actions recommended by the respondents are similar to recommendations made in the past by GAO, DODIG and the VECP PAT. In the opinion of the researcher, the interview responses demonstrate a consensus among acquisition professionals as to the actions DOD must take to improve contractor participation in VE. Top level management in DOD needs to take the appropriate steps to implement the recommended changes in order to produce more contractor VE activity and savings.

### 6. Question Six

**How valuable is the DOD VE Program?**

*a. Government Responses*




| | |
|---|---|
| Very Valuable: | 85% |
| Somewhat Valuable: | 15% |
| Not Very Valuable: | 0% |
| Not Valuable: | 0% |

**Data Presentation and Discussion:** The intent of this question was to determine if the DOD VE program is valuable enough to DOD and taxpayers to retain, promote, and encourage. The majority of respondents, eighty-five percent, indicated that DOD's VE program was very valuable. Most of the respondents who perceived the program as very valuable cited the savings garnered from VE as evidence of its value to DOD. Many of the respondents also stated that they believed the program was underutilized and had the potential to produce substantially greater savings. Some representative responses are presented below:

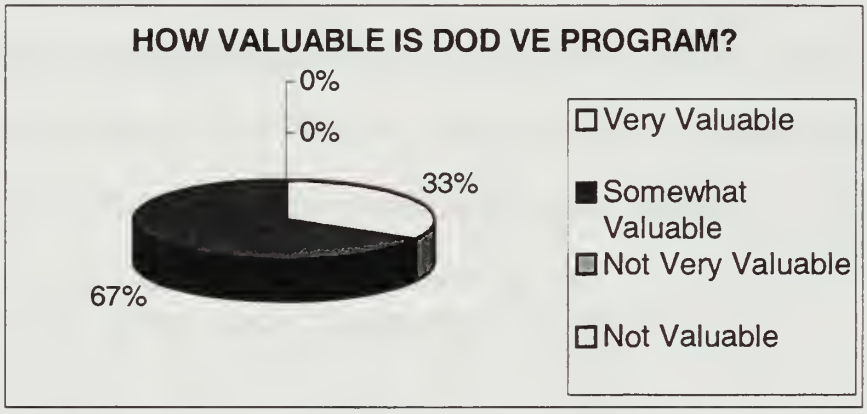
> The DOD VE program is very valuable. It has saved millions of dollars and provides a forum for innovative ideas that might otherwise never be presented or implemented.
>
> It is presently very valuable and has the potential to be much more effective. Some changes need to be made to the program for it to reach its greatest value in DOD.

The VE program is very valuable because it saves DOD a substantial amount of money, but it has much more potential. Many are frustrated by its lack of success in important areas in DOD.

DOD's VE program is very valuable for two reasons. The first is return on investment is usually very high. The second is VE helps DOD activities contain procurement costs.

When properly applied, VE is one of the better tools available to the Program Manager for reducing costs. VE has great flexibility and can be used from Milestone 0 until Disposal.

*b. Contractor Responses*

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|---|---|
| Very Valuable: | 33% |
| Somewhat Valuable: | 67% |
| Not Very Valuable: | 0% |
| Not Valuable: | 0% |

**Data Presentation and Discussion:** The contractor respondents believed the VE program was significantly less valuable to DOD than the Government respondents. Only thirty-three percent of the contractor representatives believed the VE program was very valuable to DOD. The majority, sixty-seven percent, thought the program was somewhat valuable. The reason fewer contractors found the VE program to be very valuable was the perceptions of many that it could be much more valuable than it presently is to DOD. Some representative responses are presented below:

The potential value of cost savings through the use of VE in DOD is unlimited. However, the actual dollar value of the savings in DOD is minimal.

The VE program in DOD is not being used to its fullest potential. The VE savings available are much greater than the actual savings presently achieved in DOD.

VE in DOD is very valuable when used. The program could be much more valuable if the Program Manager and leaders in DOD gave more support.

*c. **Analysis:*** The researcher found there was a significant difference between the Government and contractor responses when they were asked to gauge the value of the VE program to DOD. Most of the Government respondents indicated during the telephone interviews that the DOD VE program is very valuable to DOD, but only thirty-three percent of the contractor respondents classified the VE program as very valuable to DOD. The researcher believes the reason for this disparity in responses that there is a difference between reported VE savings and potential VE savings. Many Government respondents point to the impressive VE savings figures achieved in the past in response to question six and therefore classify the VE program as a great success. On the other hand, the contractor looks at the total amount expended for DOD acquisition programs and compares this figure to the total VE savings achieved and reasons the VE program could be much more beneficial.

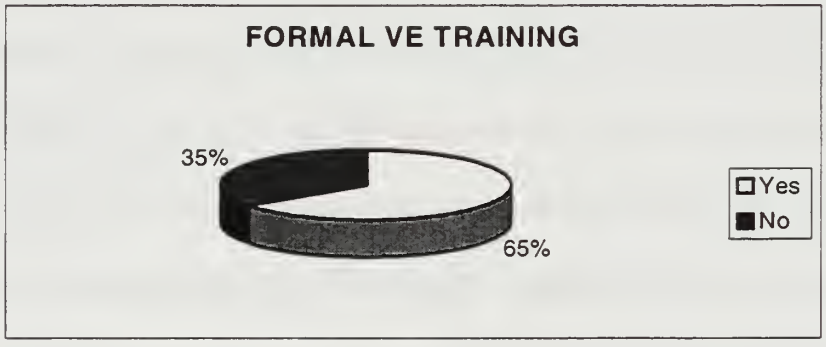
The researcher found that none of the major goals established for the DOD VE program to date have been achieved. The VE savings total is well below the established goal of one percent of Total Obligation Authority. In addition, the DODIG audits of the VE program presented in Chapter III showed significant problems with reported VE savings figures so the true savings could be substantially less than the reported savings.

The researcher believes the VE program to be valuable to DOD, but agrees with the majority of contractors that indicated VE could be much more valuable to DOD if properly administered. Contractors suggested that the VE savings figures could be much higher and the benefit for both parties could improve. The researcher also sides with the contractor opinions as to the potential value of the DOD VE program. A VE program properly implemented, supported, and funded could produce significantly greater acquisition savings while improving or maintaining the desired quality of weapon systems. Only by modifying the current VE program to eliminate or decrease barriers to contractor participation will VE's full potential be realized.

### 7. Question Seven

**Have you ever received any formal training in the area of VE? If so, what training did you receive?**

*a. Government Responses*

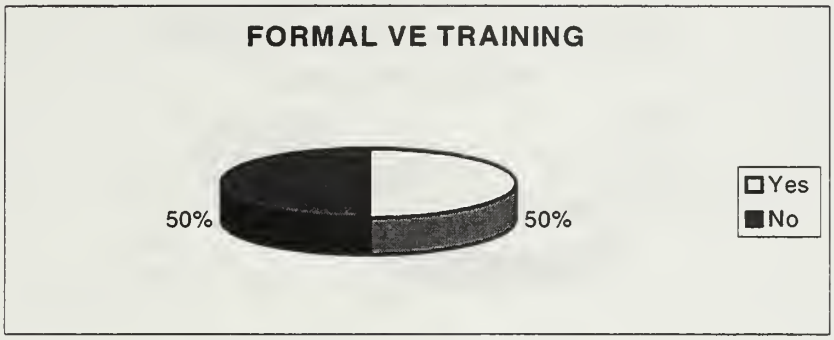



Yes: 65%
No: 35%

**Data Presentation and Discussion:** This question was designed to determine the respondent's level of VE training and the type of VE training attended. The majority of the Government personnel interviewed had received some formal training in VE. Most of the personnel that received formal training attended the

Contractual Aspects of Value Engineering (CAVE) course or the Principles and Applications of Value Engineering (PAVE) course. These courses are currently offered through the Defense Acquisition University (DAU).

***b. Contractor Responses***



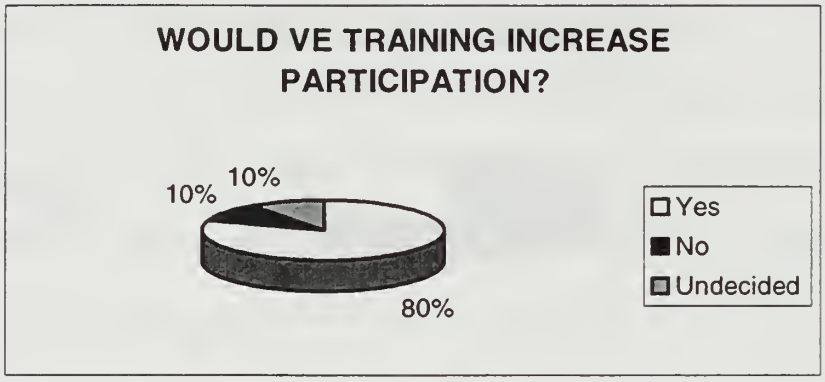

Yes: 65%
No: 35%

**Data Presentation and Discussion:** Half of the contractor personnel interviewed received some formal training in VE. The training that many attended, the Module I and Module II VE courses, are approved by the Society of American Value Engineers (SAVE). The Module I or Basic Workshop course consists of a minimum of 20 hours of training and 20 hours of live project application. The Module II course or Advanced Seminar course consists of a minimum of 24 hours of instruction. The Module II course covers eight different areas including: overview and administration; project and team structure; job plans; and functional analysis. These courses are a mandatory part of the process necessary to become a Certified Value Specialist (CVS). A CVS is considered to be an expert in the area of VE. Analysis of question seven will be presented below in part c. of question eight.

### 8. Question Eight

**Would an increase in training of DOD acquisition personnel involved in VE result in more frequent contractor participation in the VE program? Why? Why not?**

*a. Government Responses*

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|---|---|
| Yes: | 80% |
| No: | 10% |
| Undecided: | 10% |

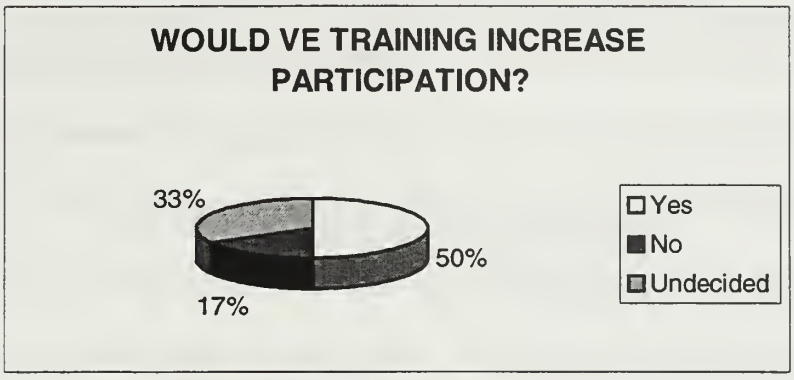
**Data Presentation and Discussion:** This question was intended to determine if additional training of acquisition personnel would encourage more active contractor participation in VE. Most of the respondents believed increased training of Government personnel involved in acquisition would result in more contractor participation in VE. The reasons cited include increased awareness of the potential of the VE program; more positive attitudes toward the VE program, and more expeditious processing of VECPs submitted. Additional comments are presented below:

> Yes, increased training would be beneficial, as long as VE is an unknown it is like death, people are afraid of it. Government acquisition personnel need to understand the benefits of VE and that it is not too difficult to perform.

> More VE training would increase awareness, increase participation, and result in more savings for the Government. Government personnel need to know that the VE technique really works.

More awareness training would be effective. The PAVE and CAVE courses serve a purpose, but everyone involved in acquisition needs to be aware of the benefits of VE.

*b. Contractor Responses*




| | |
|---|---|
| Yes: | 50% |
| No: | 17% |
| Undecided: | 33% |

**Data Presentation and Discussion:** Half of the contractor representatives interviewed believed that increased training of DOD acquisition personnel would result in more active contractor participation in VE. Seventeen percent believed that increased training would not cause contractor participation to increase. Many of the respondents believed additional VE training would be beneficial, but stated that other actions also needed to be taken for contractor participation to increase. Additional comments received are paraphrased below:

> Training is important, but motivation is the key. Government personnel must be motivated to encourage contractors to participate in the VE program. The training must be tied to motivation.
>
> It is important for a cadre of personnel to be familiar with the VE process, but not all acquisition personnel need additional training. One or two VE persons per office would be sufficient.
>
> Training would help to eliminate cultural barriers and decrease the fear many Government personnel currently associate with the VE process. Raising awareness would definitely eliminate much of the negative

attitude that is currently preventing some Government personnel from encouraging contractor participation in VE.

*c. **Analysis:*** The researcher found the level of formal VE training to be lower than expected among both the Government and contractor telephone interview respondents. Only half of the contractor respondents and only slightly above half of the Government respondents had received formal VE training. The researcher also believes the percentage of trained VE personnel in the acquisition workforce to be substantially lower than the level found among the respondents. Several of the respondents were acknowledged VE experts or champions. These experts referred other interview candidates to the researcher because of their knowledge and familiarity with the DOD VE program. The researcher believes the level of awareness of the VE program is currently low enough throughout DOD to hinder more active contractor participation in the VE program. A low level of VE training and awareness was identified as a problem during the first audits of the VE program conducted in 1977 and continues to be a problem today. In the opinion of the researcher, DOD attempts to raise awareness and educate the acquisition workforce about VE have been inadequate.

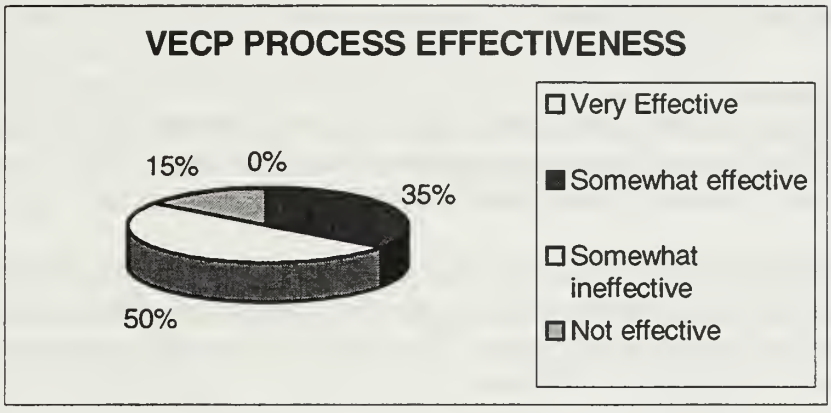
Increased training of both Government and contractor personnel would help to eliminate barriers to more active contractor participation in VE. Ignorance about the VE program's benefits, objectives, and procedures prevents its more frequent use in DOD. A greater awareness of the VE option would help to decrease apprehension, uncertainty, and suspicion that many acquisition professionals currently have about the VE program. It is important to note that both Government and contractor personnel need to raise their level of awareness about the benefits of VE. Without increased awareness and education

VE will remain a low priority among those that are not fully aware of its benefits for the Government and contractor.

### 9. Question Nine

**How would you characterize the effectiveness of the VE Change Proposal (VECP) submission and approval process?**

*a. Government Responses*



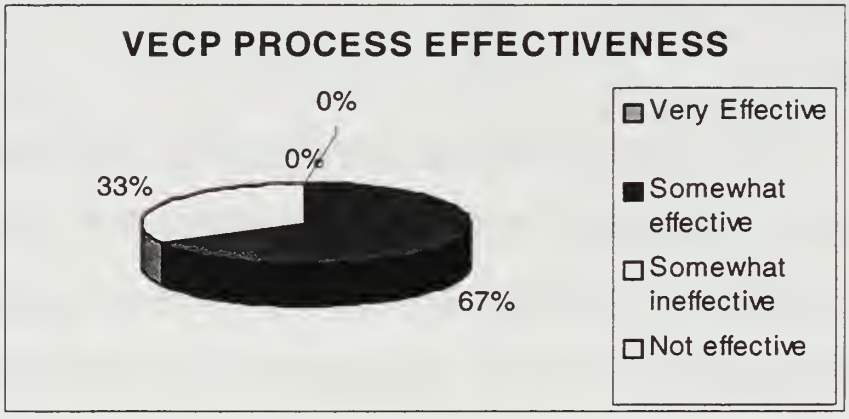

| | |
|---|---|
| Very Effective: | 0% |
| Somewhat Effective: | 35% |
| Somewhat Ineffective: | 50% |
| Not Effective: | 15% |

**Data Presentation and Discussion:** The VECP process was indicated as a potential barrier to contractor participation in VE in the literature review conducted in Chapter III. The purpose of this question was to solicit the opinions of acquisition professionals with respect to the VECP process and its effect on contractor participation in VE. Sixty-five percent of the respondents negatively characterized the VECP submission and approval process identifying it as somewhat ineffective or not effective. Respondents gave three main reasons for the above responses: the VECP process is time consuming, cumbersome, and complex. Many believe the VECP process could be

improved and made much more effective. Some representative comments are paraphrased below:

> One of the reasons that there is not more contractor participation in VE is the burdensome VECP process. There is too much of an attempt to protect the Government and this results in a lack of participation by the contractor.
>
> The VECP process is a slow process; it takes a long time to complete. We need to streamline the VECP process to encourage more contractors to participate in the program.
>
> The process is slow but it gets the job done. The determination of savings and the negotiation process are difficult and can take a lot of time. Often, VECPs are not a priority and this causes additional delay. VECPs are often on the bottom of the pile of tasks to complete.
>
> The VECP submission and approval process takes too long to complete. Often, it takes six months to three years to implement a VECP. I would recommend an expedited process. The VECP process is one reason contractors do not like VECPs.

***b. Contractor Responses***




| | |
|---|---|
| Very Effective: | 0% |
| Somewhat Effective: | 67% |
| Somewhat Ineffective: | 33% |
| Not Effective: | 0% |

**Data Presentation and Discussion:** Sixty-seven percent of the contractor representatives interviewed believe that the VECP submission and approval process is

somewhat effective. Thirty-three percent of the respondents indicated that the VECP process was somewhat ineffective. The most common complaint with the VECP process is the time it takes to complete. Contractors believe the lengthy delays associated with the VECP process discourage more frequent VE participation. Additional comments received are paraphrased below:

> VECPs usually take a long time to get settled. The delay is usually associated with authorization and approval of the VECP. Negotiation of the financial terms of the VECP also can lengthen the process.
>
> The VECP process is filled with delays. It is a long process and takes too long to settle. Negotiation of costs and savings share rates and savings share periods can cause the process to be much longer.
>
> The VECP submission and approval process can be effective. It is similar to other contract changes and the efficiency of the process largely depends on the priority placed on VECPs by Program Managers and key personnel in the Program Office. Delays arise because VECPs are rarely a priority with the Program Manager so the process is not very effective.

Analysis of question nine will be presented below in part c. of question ten.

### 10. Question Ten

**What improvements would you recommend be made to the VE Change Proposal (VECP) submission and approval process?**

#### *a. Government Responses*

**Data Presentation and Discussion:** The intent of this question was to seek input from the respondents on ways to improve the effectiveness of the VECP process. Forty percent of the respondents recommended the use of Integrated Process Teams (IPT) to expedite and streamline the VECP submission and approval process. Many respondents believed that VECPs could be handled more efficiently by using the concurrent review process available through IPTs instead of the sequential review process that is now common before VECP approval. Seventeen percent recommended

reducing the requirement for certified cost and pricing data. A similar percentage of the respondents recommended the removal of the requirement to negotiate the VECP down to the last cent. Other recommendations were also made on ways to improve the VECP process. Some representative suggestions are paraphrased below:

> IPTs could be used to streamline the current VECP process. IPTs would eliminate the need to pass the proposal from one party to the next. The IPTs must be empowered to make decisions concerning the proposals presented to them.
>
> VECPs are currently negotiated to the last penny. This needs to be changed to shorten the process. The Government and the contractor should agree on the general numbers and implement the change.
>
> The use of Undefinitized Contract Actions (UCA) would help to shorten the VECP process. UCAs would allow the contractor to begin implementing the VECP without waiting for the entire negotiation process to be completed.
>
> The use of preliminary VECPs would improve VECP processing times. The contractor should be encouraged by the Government to brief the concept prior to submitting the formal VECP.
>
> IPTs would be effective in shortening the VECP submission and approval process because the Program Manager, contractor, and administrative personnel for both sides could work together and agree on the terms of the VECP.
>
> The contractor should market the VECP before formally submitting it to the Program Office. The contractor should sell the idea for the VECP before they throw it over the wall to the Program Manager.

***b. Contractor Responses***

**Data Presentation and Discussion:** Fifty percent of the contractor personnel interviewed believed that the use of Rough Order of Magnitude (ROM) would help to streamline the VECP submission and approval process. Thirty-three percent of the respondents recommended the use of UCAs to shorten the period of time before the VECP could be implemented in the program. Seventeen percent believed that the use of

IPTs would streamline the VECP process and encourage more contractors to participate in the VE program. Representative responses are presented below:

> The use of ROM estimates to judge consideration would significantly streamline the present VECP approval process. Instead of certified cost and pricing data, ROM estimates could be used and this would significantly compress the time needed to complete the VECP process.
>
> I would recommend the use of IPTs and UCAs to streamline the present process. The current delay in approval discourages future VECP submittals because the contractor believes VECPs are not a priority with the customer.
>
> The VECP submission and approval process needs to be streamlined. It currently takes 12-18 months to complete the VECP arrangement. The pace of change demands that the process be shortened to weeks rather than years. I recommend the use of IPTs to speed up the process.

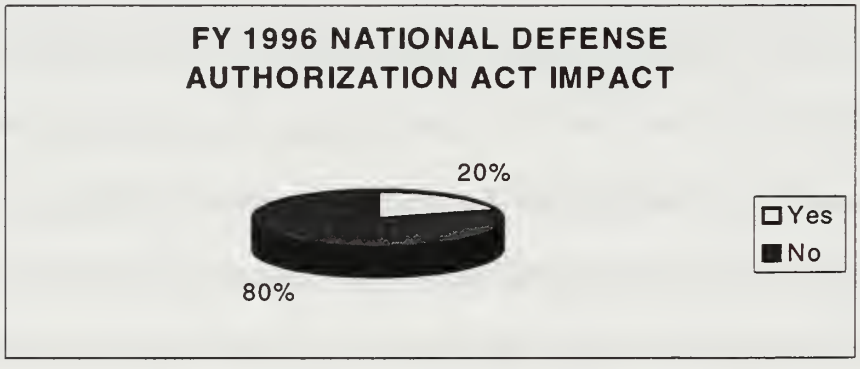
*c. **Analysis:*** The result of the responses to questions nine and ten concerning the effectiveness of the VECP submission and approval process were somewhat surprising to the researcher. The literature review conducted by the researcher indicated that the VECP process is a major barrier to active contractor participation in VE. The respondents indicated that the VECP process is a problem or barrier but not the most significant. In fact, 67 percent of the contractor respondents indicated that the VECP process is somewhat effective. Many of the contractors characterized the VECP process as somewhat effective because it eventually works. The majority of contractors simply feel that the process takes longer than necessary. Also, in the opinion of the researcher, contractors may have a less negative view of the VECP process because the majority of the work associated with the process is the responsibility of the Government. After VECP submission, the contractor waits for Government approval and the final negotiation procedure. Conversely, the Government must push the VECP through the numerous, complicated steps of the VECP process.

The researcher believes the recommendations offered by the respondents for improving the VECP process should be adopted for two important reasons. First, the VECP process needs to be shortened to increase the benefit to the Government and the contractor. By decreasing the time needed to implement a VECP, the potential for Government savings is increased and the contractor also has an increased opportunity for financial benefit. Second, by streamlining the VECP process, more VECPs will be submitted and approved. Many contractors do not wish to participate in the VE program because of the awkward, lengthy nature of the current VECP process. Also, Program Managers are not soliciting VECPs because of the additional workload placed on their program when a contractor submits a VECP. By lessening the burden of the VECP process on the contractor and Program Manager, DOD will receive more VECP submissions and achieve increased cost savings.

### 11. Question Eleven

**The Fiscal Year 1996 National Defense Authorization Act included the requirement for Federal agencies to establish and maintain VE programs. Did this requirement have any impact on your organization? If so, What was the impact?**

*a. Government Responses*

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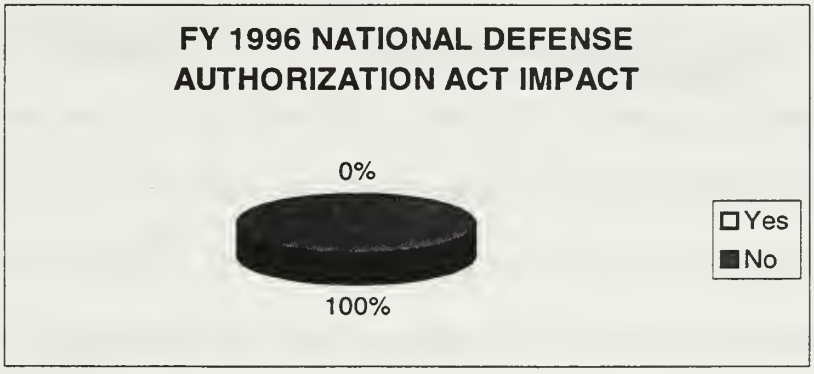
|---|---|
| Yes: | 20% |
| No: | 80% |

**Data Presentation and Discussion:** This question was designed to gauge the impact on DOD that was made by the above legislation that directs Federal agencies to establish and maintain VE programs. The overwhelming majority of the respondents questioned stated that the Fiscal Year 1996 National Defense Authorization Act had no impact on their organization. Most cited the fact that DOD organizations already had adequate VE programs prior to the legislation. The respondents felt the requirement to establish and maintain a viable VE program was already satisfied in DOD. The respondents who believed the legislation did impact their organization cited increased attention placed on VE as a result of this additional requirement. The respondents felt the legislation stimulated discussions among acquisition personnel about VE and worked as additional firepower for greater use of the VE program inside DOD.

***b. Contractor Responses***

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|---|---|
| Yes: | 0% |
| No: | 100% |

**Data Presentation and Discussion:** All of the contractor personnel agreed that the inclusion of VE clause in the Fiscal Year 1996 National Defense Authorization Act had no impact on their organizations. Most stated that the DOD organizations that they dealt with already had VE programs in place. One respondent

stated that the legislation raised some questions at the local Defense Contract Management Command (DCMC) office and increased attention to VE, but there was no increased contractor participation in VE.

### 12. Question Twelve

**How are you organized to accomplish VE? Does your organization have adequate resources to accomplish your VE objectives?**

#### *a. Government Responses*

**Data Presentation and Discussion:** This question was intended to determine the different levels of personnel support that exist throughout DOD and which support frameworks were most beneficial. The organization of VE support among DOD agencies varied widely depending on the particular service or activity. Most respondents believed the Army was the best organized to accomplish their VE objectives. The Army has several trained personnel assigned to assist Program Managers and Program Offices accomplish VE. The Army also has well-trained VE personnel assigned to each of its buying commands to support the VE effort. Additionally, the VE personnel in the Army are assigned VE functions as their primary duty. Conversely, the Air Force and the Navy have very few personnel assigned to support VE objectives. The personnel that are assigned to encourage or promote VE in the Air Force and Navy usually have other primary responsibilities and perform VE functions on a collateral basis. Seventy-five percent of the respondents believed that the assignment of additional personnel resources would result in more active contractor participation in VE.

#### *b. Contractor Responses*

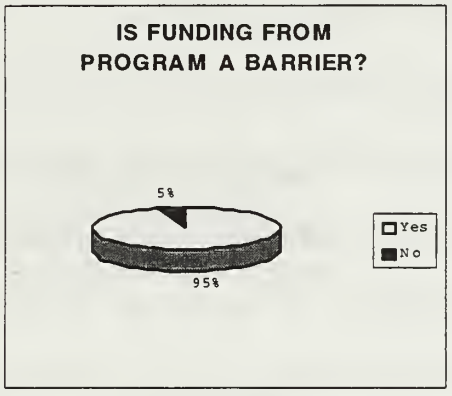
**Data Presentation and Discussion:** Sixty-six percent of the contractor personnel believed they possessed adequate resources to accomplish VE for DOD

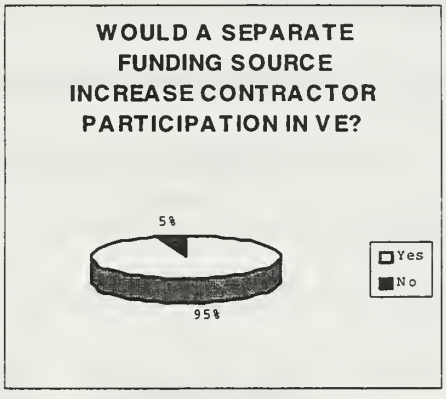
activities. Many felt that since demand was relatively low for VECPs in DOD, the assignment of additional contractor resources would be wasteful. All of the contractors interviewed employ dedicated personnel assigned to work VE issues for their companies. The personnel are usually assigned to the engineering department and work with many of the functional business groups including contracting, finance, and manufacturing.

### 13. Question Thirteen

**Is the requirement for Program Managers to fund VE Change Proposals (VECPs) from the program budget a barrier to more active contractor participation in VE? Would a separate funding source encourage more VECP submissions?**

*a. Government Responses*



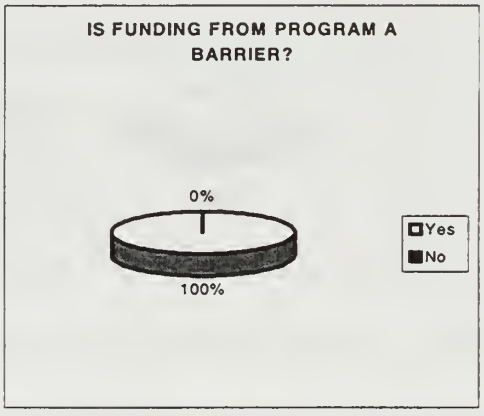



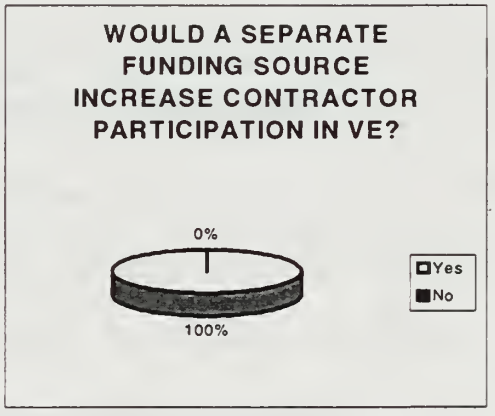

Yes: 95%
No: 5%

**Data Presentation and Discussion:** This question was intended to determine if funding was a barrier to more active contractor participation in VE and whether the establishment of a separate funding source would encourage more VECP submittals. Ninety-five percent of the respondents indicated the requirement for Program Managers to fund VECPs from the program budget is a barrier to more active contractor participation in VE. The problem as described by most respondents was that funding issues surrounding VECP submission and approval often prevented beneficial

suggestions from being adopted. If a VECP has a negative impact on the instant contract the Program Manager has to locate additional funding in order to proceed with the proposal. Another funding issue raised by the respondents is the disposition of the cost savings that result from an approved VECP. Many respondents believe that the tendency for Government comptrollers to step in and take or reclaim cost savings achieved from an approved VECP creates a negative bias toward VECPs among Program Managers. Ninety-five percent of the respondents indicated in their answers to the second part of this question that the creation of a centrally managed revolving fund that is accessible to the Program Manager to fund VECPs would dramatically increase contractor participation in VE.

### *b. Contractor Responses*




| | |
|---|---|
| Yes: | 100% |
| No: | 0% |

**Data Presentation and Discussion:** All of the contractor personnel indicated that the requirement for the Program Manager to fund VECPs from the program budget was a barrier to more active contractor participation in VE. Some of the reasons given by the contractors were: the negative financial impact of the development costs of the VECP on the instant contract; the potential decrease in program funding as a

consequence of an approved VECP; and the problem that the cost savings will not be realized until later in the life of the program. In response to the second part of this question, all of the contractor personnel believed a separate VE funding source available to the Program Manager would increase contractor participation in the DOD VE program. Most believed the separate funding pool would encourage the Program Manager to accept VECPs, since there would not be a negative financial impact on the program. Contractors would also be more inclined to participate in the VE program knowing that there was funding available for their innovative, cost-saving ideas.

*c. **Analysis:*** The researcher found that funding constraints often prevented the Program Manager from adopting or approving a VECP. The indications given by both the Government and contractor respondents validate the literature review finding that funding is a barrier to more active contractor participation in VE. The researcher found that the funding limitations occur for a variety of reasons including: no source of unobligated funds to pay VECP development and implementation costs; funds in one procurement account cannot be used in a timely fashion to pay costs associated with another procurement account; costs can not be applied against accounts outside the Program Manager's control; and major funding demands are placed on program offices when VECP savings do not accrue to the instant contract.

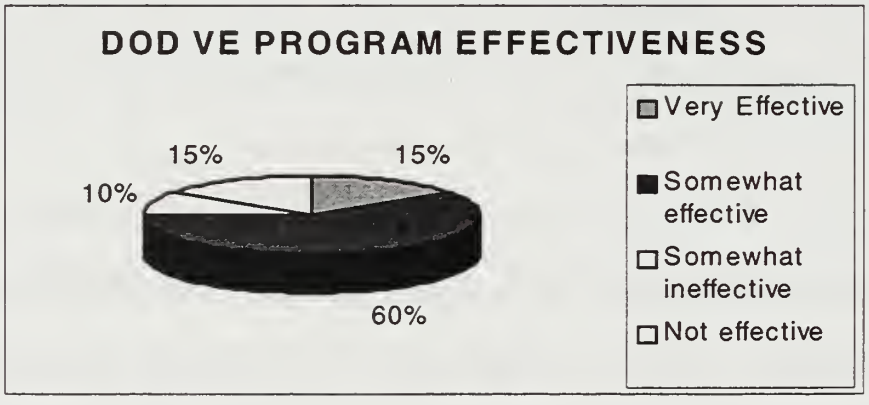
The most frequently recommended solution to the funding problem, which is advocated by both Government and contractor personnel, is the establishment of a centrally managed VE fund. The vast majority of the respondents enthusiastically support this option. The researcher believes this solution is viable and popular for two reasons. First, the VE fund would allow the Program Manager to decrease costs and

improve the quality of their product without a negative financial impact on their own program. The centrally managed fund could be used to cover the costs associated with the VECP request and allow the Program Manager to consider the proposal on its own merits and not be concerned with an adverse financial impact on their program. Also, if properly managed a percentage of the cost-savings achieved through the implemented VECP could be returned to the VE fund to keep it solvent. Second, the fund would encourage contractors to submit more VECPs. There are two reasons more VECPs would result from the establishment of a centrally managed VE fund. The first reason is the Program Manager will be inclined to solicit VECPs from the contractor because he is now free from any VECP funding burden. Secondly, the contractor would be aware that a separate funding source exists to cover the costs of the VECP and would work to get a share of the VE fund for their organization.

### 14. Question Fourteen

**How would you characterize the overall level of effectiveness of the VE Program in your organization?**

*a. Government Responses*

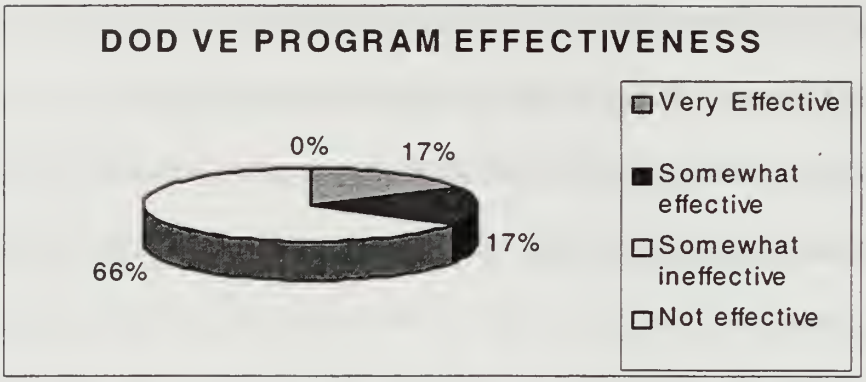



| | |
|---|---|
| Very Effective: | 15% |
| Somewhat Effective: | 60% |
| Somewhat Ineffective: | 10% |
| Not Effective: | 15% |

**Data Presentation and Discussion:** This question was intended to solicit the opinions of the respondents concerning the overall effectiveness of the DOD VE program. The majority of respondents indicated that the DOD VE program was slightly effective in their organization. Many believed the program was very beneficial to DOD, but that it could produce much greater cost savings. Some representative responses are paraphrased below:

> The VE program is beneficial to DOD, but the current cost savings are just the tip of the iceberg. There is much more room for improvement and success with the program.
>
> There are pockets of great success with the VE program in DOD. The Army and DLA have pretty good results, but as a whole DOD could do much better and be more consistent with the program.
>
> The VE program still has major barriers to overcome, but we have experienced moderate success. Some people within DOD are dedicating time and energy to the program, but often VE is still a tough sell.
>
> The effectiveness of the VE program has been spotty. The degree of success varies widely from agency to agency. Some agencies have a large amount of VE activity and others have no activity. Success depends upon the amount of support and emphasis the program is given by upper management.
>
> The VE program has room for improvement, but it has been tremendously successful based on the total savings it has produced in DOD.

*b. Contractor Responses*




| | |
|---|---|
| Very Effective: | 17% |
| Somewhat Effective: | 17% |
| Somewhat Ineffective: | 66% |
| Not Effective: | 0% |

**Data Presentation and Discussion:** Most of the contractor personnel interviewed believed that the VE program in DOD was somewhat ineffective. Most indicated that the program was ineffective because of its lack of use in the majority of acquisition programs. Two representative responses are paraphrased below:

> The effectiveness of the VE program is hindered by the Government's apparent disinterest in the program. There is no perceived importance of VE within DOD. The contractor does not want to jeopardize its relationship with the customer to push VE.

> We are lucky to get one VECP per year approved and we have numerous active programs with DOD including C-17, F/A-18, V-22, and T-45. The VE program could be much more effective.

*c. **Analysis:*** Comparison of the Government and contractor responses to question fourteen provides an interesting insight into the current view of the VE program among acquisition professionals. The majority of Government respondents found the VE program effective. Conversely, the majority of contractors characterized the VE program as somewhat ineffective. In the opinion of the researcher, the difference in viewpoints is caused by different sets of goals for Government and contractor acquisition professionals.

Government employees seek to use the DOD VE program to achieve cost savings or reductions and product improvement. DOD agencies have been fairly successful in achieving considerable VE savings. The savings achieved in 1996 through VECPs was $93.8 million [Ref. 3, p. 1]. These savings are substantial and Government employees that participated in the achievement of these savings should be proud. The problem is the savings touted by the supporters of the VE program may not be accurate. As pointed out by the audits conducted by DODIG and presented in Chapter III, the actual savings may be much less. In the opinion of the researcher, more accurate reporting of the VE savings would cause greater top level attention to the VE program because the savings would be substantially lower than current estimates and even farther from the established VE savings goals. Greater top level attention would result in more Government and contractor support for the VE program, which would drive increased VE savings.

The contractor acquisition professionals have a slightly different impression of DOD's VE program. The contractors observe the infrequent use of VE within DOD, especially on Major Defense Acquisition Programs (MDAPs), and conclude the VE program is somewhat ineffective. All respected defense contractors desire to provide a quality product and make a profit for their shareholders. Infrequent use of the VE program translates into fewer opportunities for the contractor to use their special skills and abilities to increase return to shareholders. The contractors indicated to the researcher during the telephone interviews that they believe the Government would also benefit from more frequent contractor participation in the VE program. The researcher agrees that the Government could reap substantial benefits from wider, more frequent use of the VE program. The current lack of use of the VE program has resulted in missed

cost reduction opportunities and less capable weapon systems. VE is a time tested, proven methodology that works and in order for DOD's VE program to become more effective, DOD must increase contractor participation.

### 15. Question Fifteen

**Is current DOD top-level management support of the DOD VE program sufficient to encourage more active contractor participation in the VE program?**

*a. Government Responses*

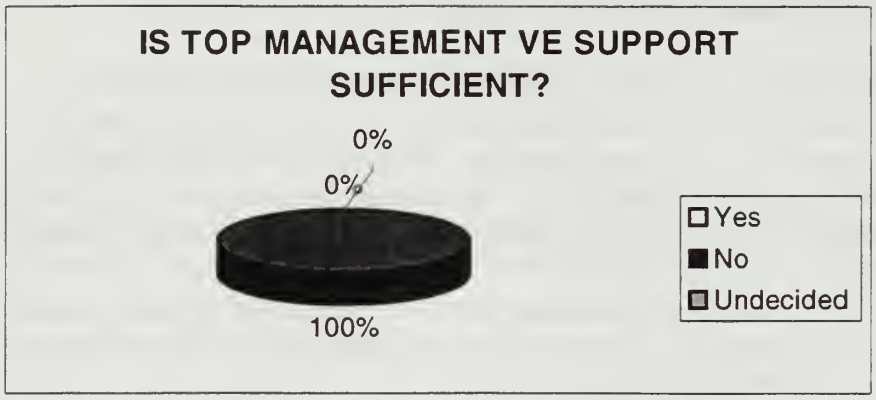
| | |
|---|---|
| Yes: | 10% |
| No: | 80% |
| Undecided: | 10% |

**Data Presentation and Discussion:** The literature review conducted in Chapter III indicated that DOD top-level support for the VE program was insufficient. This question was intended to determine how the acquisition professionals perceived the top-level support within DOD. The majority of the Government acquisition personnel questioned believed that top management support of the VE program is insufficient to encourage more active contractor participation in the VE program. Most of the respondents added that an increase in emphasis on the VE program from top managers in DOD would have a positive impact on contractor participation in the program. Many felt

that without emphasis from the top down, the VE program would continue to be underutilized. Some representative responses are included below:

> No, the VE program does not receive adequate support from top management. Top management in DOD must continually push the program with letters and speeches. We have had VE conferences they were supposed to speak at and they invariable cancelled. This sends the Program Managers and the contractor community the wrong message.
>
> No, VE needs more encouragement. The senior level leaders within DOD need to emphasize the importance and value of VE. VE must be perceived as a valuable tool.
>
> There has not been a strong show of support for the VE program. The Program Managers must be stimulated to use VE. We need to establish metrics and incentivize Program Managers to encourage contractors to submit VECPs.
>
> Top managers within DOD endorse VE but often they have bigger fish to fry. What they say about VE is lip service for the most part. They have other issues to worry about.
>
> The support for the VE program is at its highest point in the last five years. Top management now recommends VE as one of several ways to trim costs in a program. VE is portrayed as one of the methodologies; not the only option available to the Program Manager for cost saving.
>
> Historically, top management has not supported VE. There have been peaks and valleys, but no consistent support. VE is not a priority under the Acquisition Reform initiatives.
>
> VE needs more support from top management. DOD needs to look at new ways to increase the use of VE. There must be some metrics of performance on the Program Manager to encourage their use of VE.

*b. Contractor Responses*




| | |
|---|---|
| Yes: | 0% |
| No: | 100% |
| Undecided: | 0% |

**Data Presentation and Discussion:** All of the contractor personnel questioned believe that DOD top management support for the VE program is insufficient to encourage more active contractor participation. Some representative responses are included below:

> Program Executive Officers must keep statistics on the use of VE and start counting VECPs in order to increase use of the program. There needs to be more of a push to get the program rolling.
>
> There must be more advertising of the VE program's success stories. DOD leaders need to demonstrate support of the program to Government personnel and contractors.
>
> All top management support currently consists of is an occasional letter or directive. VE must be measured in order for it to be successful. DOD leaders must establish cost savings goals in order to increase the success of the program.
>
> Periodic announcements of support for the VE program are insufficient to change anyone's behavior toward VE. Reporting requirements must be established in order to increase contractor participation.

*c. Analysis:* Both Government and contractor personnel agree that there is insufficient support for the VE program among top-level DOD management. In the

opinion of the researcher there are two reasons for the lack of support. First, there are many other cost saving initiatives currently being emphasized by DOD leaders. VE is not one of the popular acquisition reform initiatives. The more popular initiatives include Cost as an Independent Variable (CAIV), Modernization through Spares, and Single Process Initiative (SPI). There are only a limited number of initiatives that can be emphasized by leadership and because of the introduction of these other alternatives VE has taken a back seat.

Second, the VE program has been around for over forty years. DOD leaders are all somewhat familiar with the program and its well-documented shortcomings. DOD leadership may have decided that other cost saving initiatives can be more effective than VE. In the opinion of the researcher VE is still an excellent way to reduce cost and maintain or improve product quality.

Much of the evidence reviewed or gathered by the researcher indicates that where there is emphasis on VE by Senior DOD Leadership, VE activity is more successful. The complexity of the VECP process and the funding burden the VECP places on the Program Manager keep it from being aggressively pursued on its own merits. Increased top level emphasis is required to allow the VE program to reach its full potential.

## C. SUMMARY

The results of interviews with 30 DOD and contractor acquisition professionals familiar with the DOD VE program were presented in this chapter and numerous recommendations to improve contractor participation in the DOD VE program were

suggested. The following chapter summarizes this study, draws conclusions, supports recommendations for improvement, and suggests areas for additional research.

# V. CONCLUSIONS, RECOMMENDATIONS, AND AREAS FOR ADDITIONAL RESEARCH

## A. GENERAL

The DOD VE program offers acquisition professionals a potentially valuable tool to help lower procurement costs, reduce life cycle costs, and improve product quality when procuring defense systems. However, decision-makers must weigh the effectiveness of VE versus the multitude of other cost reduction methods that are currently available as a part of acquisition reform. Decisions concerning the use of VE or another cost saving option can be critical to the eventual success or failure of a particular program. Decision-makers must be fully informed as to the benefits and risks associated with the use of VE.

In order to answer the primary question of this thesis, "What are the barriers inhibiting contractors from actively participating in the DOD Value Engineering Program, and what actions could be taken to increase participation?" a literature review and telephone interviews were conducted. The telephone interviews presented in Chapter IV provided insights into the use of VE within DOD. The telephone survey consisted of 15 questions which were designed to identify the barriers that prevent contractors from participating in VE and solicit input from both defense and contractor acquisition professionals on ways to improve contractor participation in VE. The respondents included Government and contractor VE experts as well as acquisition personnel familiar with the DOD VE program but not VE specialists. A mixture of VE experts and non-experts was desired by the researcher to gain the most accurate representation of DOD's VE program. The interview questions focused on potential barriers to more active

contractor participation in VE that were identified during the literature review conducted in Chapter Three. The survey questions concentrated on five key areas. The key areas examined were:

1. The existing regulations and policies for the administration and use of the DOD VE Program, including recent changes meant to increase contractor participation.

2. The top-level DOD management and DOD Program Manager support for the DOD VE program.

3. The current level of training and awareness of the acquisition personnel responsible for the implementation and encouragement of the DOD VE program.

4. The effectiveness VECP submission and approval process.

5. The impact declining funding and personnel resources have had on contractor participation in the DOD VE program.

Based on the in-depth examination of the above five key areas of this research, the purpose of this chapter is to outline the critical issues voiced by current DOD acquisition professionals and their counterparts at defense contractor sites. The researcher believes these acquisition professionals are best able to identify the barriers to more active contractor participation in VE because they deal with VE issues, problems, and successes on a daily basis. Many of the responses received during the telephone interviews reinforced the literature review findings presented in Chapter Three. The following conclusions and recommendations are presented for the completion of this thesis.

## B. CONCLUSIONS

The purpose of this thesis was to determine the barriers to more active contractor participation in the DOD VE program. The first conclusion of this study is:

**1. There are significant existing barriers that prevent more active contractor participation in VE.**

The literature review and telephone interviews revealed several barriers that prevent more active contractor participation in VE. All of the respondents agreed that the DOD VE program is very or somewhat valuable to DOD. All of the respondents also agreed that the VE program could be much more valuable to DOD in terms of dollar savings if the barriers preventing more contractor participation could be lessened or removed. The barriers identified in this research are presented below:

**a. Funding:** The most significant barrier identified in this research effort was the funding burden placed on the Program Manager by a VECP. The Program Manager must find necessary funding in order to implement a VECP. VECPs can have a negative funding impact on the instant contract and the Program Manager must find other procurement dollars to fund the VECP.

**b. VECP Submission and Approval Process:** The majority of the respondents characterized the VECP process as somewhat ineffective or not effective. The VECP process was described by many as lengthy, cumbersome, confusing, and difficult. The current time standard of 45 days for approval of VECPs is not being met with consistency. The entire submission and approval process can take several months to complete. This delay minimizes Government savings and contractor benefit.

**c. VE Awareness:** The level of awareness of the VE methodology and the benefits of the DOD VE program were thought to be low among acquisition professionals by the respondents. Eighty percent of the contractors and fifty percent of the Government acquisition personnel interviewed believed that increased training would result in more active contractor participation in VE. The low level of awareness caused confusion and created suspicion about the merits of the VE program for DOD among Government personnel.

**d. Top Level Management Support:** One hundred percent of the contractor and eighty percent of the Government acquisition personnel interviewed stated that the level of support shown by top level management within DOD was insufficient to encourage more active contractor participation in the DOD VE program. Many stated that VE must compete for resources with the other cost saving initiatives currently touted by DOD leaders. The focus has shifted from VE to other cost saving programs that may not be as effective as VE.

**2. DOD Program Managers have little or no incentive to encourage more active contractor participation in VE.**

Often, Program Managers do not encourage contractors to submit VECPs because the VECPs impose additional requirements and workload on their program and can create funding problems. Also, many Program Managers are not aware of the benefits of VE and do not have sufficient time to devote to familiarizing themselves with VE because of the numerous other tasks that they must complete. Many Program Managers familiarize themselves with the VE option only when their program is in financial trouble and is searching for ways to cut costs while maintaining system capabilities. If a program is on schedule and on cost, the Program Manager will naturally be reluctant to introduce more risk into their program by using VE.

**3. The recent FAR deviation issued by the Director of Defense Procurement will encourage more active contractor participation in VE.**

The FAR deviation issued by the Director of Defense Procurement increased the savings sharing percentages and sharing time periods that can be negotiated as part of a VECP agreement. This FAR Part 48 deviation improves the contractor's potential to profit by submitting a VECP. Therefore, the researcher believes the number of VECPs will increase. Over eighty percent of the total respondents questioned agreed that the FAR deviation, one of the recommendations of the Deputy Under Secretary of Defense VECP Process Action Team, will result in more active contractor participation in VE.

**4. The DOD VE program can be a valuable tool for reducing costs while maintaining system requirements and performance.**

One hundred percent of the respondents indicated that the DOD VE program was very or somewhat valuable to DOD. Many of the respondents pointed to the tremendous dollar savings achieved by DOD as a result of the VE program. Several respondents

cited Defense acquisition program examples in which VECPs had played vital roles in the success of the programs. Most indicated that the VE program offers DOD and other Federal agencies even greater opportunities for conserving procurement dollars while maintaining or improving system performance. The researcher found that the VE methodology has withstood the test of time and is as viable today as it was when it was initially developed over forty years ago.

**5. There is a wide variation in the use and success of the VE program within DOD agencies.**

The telephone interviews revealed that the different services and agencies within DOD have varying levels of success with the VE program. Most respondents indicated that the Army has the most successful VE program within DOD because of the concentrated effort, personnel support, and management support provided for the VE program within the Army. The Air Force and Navy have less active contractor participation and success with the VE program because of lower levels of awareness of the VE option, less emphasis and encouragement from top level management, and fewer dedicated personnel resources. The Army and DLA were the only agencies identified within DOD to have dedicated personnel resources specifically assigned to support VE efforts. DLA's VE program was also considered to be one of the better programs by the respondents despite the far fewer opportunities for application of the VE methodology because of the large percentage of small dollar purchases made by DLA.

**6. The fiscal year 1996 National Defense Authorization Act that included the requirement for Federal agencies to establish and maintain VE programs will have little effect within DOD.**

The inclusion of the requirement for Federal agencies to establish and maintain VE programs will have little impact within DOD. One hundred percent of the contractor

and eighty percent of the Government acquisition personnel interviewed indicated that this Federal mandate had no impact on their organization. The respondents cited the fact that within DOD, established VE programs were in place and in compliance with the new requirement. Many of the respondents indicated that the new Federal VE requirement would have little impact because of the non-specific nature of the wording in the law. There were no new reporting requirements or goals established as part of the new mandate. Many respondents believed that the reason the requirement for Federal agencies to establish and maintain VE programs was included in the National Defense Authorization Act was for Federal agencies outside of DOD. Many of these Federal agencies did not have existing VE programs and now would be required to establish VE policies and procedures.

**7. The multitude of cost saving initiatives currently sweeping through DOD creates competition for the limited personnel and financial resources needed for the VE program.**

The numerous cost saving methods that are currently being discussed and encouraged throughout DOD as a part of acquisition reform, including Cost As an Independent Variable (CAIV), Design to Cost (DTC), and Single Process Initiative (SPI) have created competition for VE within DOD. Program Managers have many options to choose from when deciding the best procedure to contain costs in their program. Often, Program Managers will adopt the cost saving methods that are preferred by the cognizant Program Executive Officer (PEO) or Defense Acquisition Executive (DAE). The multitude of cost saving initiatives has effectively blurred the lines of distinction between the different methods available and created confusion about which particular method can be most effective. The Program Manager is typically too busy to make an independent decision as to which method is best suited to their particular program and consequently

adopts the cost saving initiative that is the current hot topic. Since VE has been around for so many years, it is often overlooked as a cost saving option.

**8. Decreasing DOD budgets, declining production rates, and unstable program funding have had a negative impact on contractor participation in VE.**

Declining defense budgets have resulted in smaller production quantities and fewer new DOD acquisition programs. One result of the smaller defense budgets, lower production quantities, and fewer new programs has been the creation of fewer opportunities for contractors to develop VECPs. Consequently, fewer VECPs have been submitted and fewer VECPs have been approved in the last several years. The decline in VECP savings that was shown in Chapter Two of this thesis can only partly be attributed to the downturn in defense spending. Other factors discussed in this research have also contributed to the decrease in contractor participation in VE. The DOD VE program will need to adapt to the new procurement environment in order to remain a viable option for Program Managers and acquisition professionals.

**9. There are inadequate personnel resources dedicated to the VE program within DOD.**

While conducting the literature review and telephone interviews the researcher discovered that there are very few personnel resources dedicated to the accomplishment of VE within DOD. Many of the respondents indicated that the personnel reductions in DOD over the last several years have dramatically reduced the number of VE experts in the Navy and the Air Force. The Army has also felt the impact of the personnel reductions in the VE area, but to a lesser extent than the Navy and Air Force. The fiscal year 1996 DOD VE statistics compiled by the Office of the Under Secretary of Defense for Acquisition and Technology showed a fifteen percent decline in manpower support

from 1995 to 1996. The report also revealed that total manpower support for the VE program in DOD was 211 man-years. The man-years figure included full-time and other part-time support personnel. Of the 211 total man-years attributed to VE support throughout DOD, 76 percent of the support was for the Army and DLA VE programs. The Air Force and Navy have very few personnel resources dedicated to the accomplishment of VE objectives and need to increase the manpower support to achieve greater savings through the VE program.

**10. The use of Performance Specifications has introduced uncertainty concerning the application of VE under performance-based contracts.**

As DOD transitions to the use of performance specifications as the preferred contracting approach for development and procurement contracts, the future application of the VECP is uncertain. Many Government and contractor acquisition professionals expressed the view that use of performance specifications may mean the end of the VECP. In their view, under a performance-based contract, the contractor may alter many contract requirements without requiring a contract change approved by the Government. Under this scenario, the only remaining opportunity for a contract change (a basic requirement for a VECP) is to alter the top-level performance specification. The respondents felt that there would be few VECPs proposing changes to the performance specification, and that this would in effect, eliminate the VECP as a primary savings mechanism. A substantial number of the acquisition professionals interviewed perceived the transition to the use of performance specifications to be a significant detriment to the viability of the VECP.

The Government may or may not include the contractor's proposed specifications and detailed technical data packages in a contract. To the extent that the proposed

specifications and detailed technical data packages are included, the Government maintains configuration control over the product. Where they are not made contractually binding, the contractor is free to change the configuration without Government approval. The specific contract requirements governing the change control or configuration management determine the degree to which traditional application of the VECP applies to a given contract. Today's acquisition programs utilize a wide variety of approaches to configuration control. As such, the degree to which traditional use of the VECP can be used as a principal savings vehicle varies widely. In the opinion of the researcher, opportunities remain for the VECP to provide an effective incentive to reduce cost and improve product performance.

## C. RECOMMENDATIONS

The following six recommendations are designed to improve contractor participation in VE and were developed as a result of this research effort. The recommendations are:

### 1. Establish a centrally managed DOD VE fund.

One of the primary barriers to more active contractor participation in VE identified in this research effort is funding. Funding limitations are believed by the respondents to adversely impact the Program Manager's ability to pay for the costs associated with a VECP. The researcher found that funding issues associated with VECPs substantially contributed to the decline in the number of VECPs submitted.

One hundred percent of the contractor and ninety-five percent of the Government acquisition professionals questioned indicated that an effective method for addressing the current funding problem is the creation centrally managed VE fund. The fund would

provide a stable funding source for VECPs. As envisioned by the researcher, the centrally managed fund would be available to all Program Managers throughout DOD. Management of the fund would be the responsibility of a fund manager specifically assigned that task. Sixty percent of the savings generated as a result of an approved VECP would be returned to the fund to ensure the fund's solvency, and the remaining forty percent would be returned to the Program Manager to reinvest in their program. Also, the percentage of VECP savings returned to the Program Manager would need protection from recoupment by the assigned Government comptroller. Protection of the savings generated by the VECP and returned to the Program Manager is important to prevent the creation of a negative bias toward the VECP option.

**2. Streamline the VECP submission and approval process.**

The evidence gathered in the literature review and telephone interview sections of this research effort strongly suggests the VECP submission and approval process needs to be improved. The VECP process length, complexity, and cumbersome nature combine to discourage contractor participation in VE. The researcher recommends the following four actions be taken to streamline the VECP submission and approval process:

**a. Use Integrated Product Teams (IPTs) to process VECPs:** The most common recommendation of the Government acquisition personnel was the use of IPTs to decrease the processing time currently required for VECPs. The IPTs must include contractor and Government personnel needed to address key issues associated with each VECP. Also, the IPT must be empowered to make accept or reject decisions about VECPs. The key to successful use of the IPT is to ensure that both the Government and contractor are properly represented and each team member uses a win-win approach to problem solving and conflict resolution.

**b. Use Undefinitized Contract Action (UCA):** The UCA can be used to more rapidly implement the VECP after technical review and approval. The UCA allows the contractor to implement the VECP while the final costs are negotiated and settled. The result of the successful use of the UCA will be greater cost

savings for the Government and more opportunity for the contractor to profit from the approved VECP.

**c. Use Preliminary VECPs:** The preliminary VECP provides the contractor the opportunity to informally present the prospective VECP to the Program Manager. Use of the preliminary VECP will encourage the Government and the contractor to work together to achieve cost reduction and lower the number of VECPs that are rejected by the Government.

**d. Waive the requirement for certified cost and pricing data:** One of the most time consuming aspects of the VECP approval process is the final negotiation of the costs associated with the VECP. The contractor is required to submit certified cost and pricing data for final negotiation of the VECP in accordance with the Truth in Negotiations Act (TINA). A waiver of this requirement will reduce the preparation time for negotiation and allow a quicker final agreement and result in increased savings for the Government.

**3. Increase VE awareness and training among Government and contractor personnel.**

The current level of VE awareness among acquisition professionals, Government and contractor, is insufficient to stimulate more active contractor participation in VE. DOD Program Managers, Contracting Officers, and acquisition workforce personnel need to be more familiar with the VE program in order to capitalize on the program's potential benefits. Contractor personnel must also be well informed and comfortable with the DOD VE program in order to understand Government requirements and submit VECPs that have a better chance of being approved. Eighty percent of the Government and fifty percent of the contractor respondents indicated that increased VE training would result in more active contractor participation in VE. The researcher recommends periodic training seminars that focus on the numerous methods currently available for cost reduction, including the VE program. The cost reduction seminars should become mandatory training for all defense acquisition workforce personnel. These seminars will also alleviate many of the concerns that Government acquisition personnel have about the

VE program. Contractor personnel should also be encouraged by the Program Manager to attend the cost reduction seminars. By increasing Government and contractor awareness of the VE program more contractors will be encouraged to submit VECPs, and Government personnel will be more inclined to encourage contractor participation and less inclined to discourage or reject VECP submittals.

**4. Ensure necessary VE personnel resources are available to the Program Manager.**

The Program Manager must have adequate resources at their disposal to encourage contractor participation in VE. Funding resource issues were addressed in recommendation number one. The Program Manager also must have sufficient personnel resources that enable VECPs to be effectively evaluated and processed. The Army provides the example for the other Services and agencies in this area. The Army has dedicated VE personnel positioned to support and encourage Program Managers to embrace the VE program. This support structure permits Program Managers to encourage contractor participation in the VE program. The Air Force and Navy do not have sufficient VE personnel assigned to support their Program Managers. Without sufficient personnel support, savings opportunities will continue to be missed by the Air Force and Navy. The researcher recommends that each major buying activity in the Air Force and Navy have at least one VE expert or champion. The VE champion could train other acquisition personnel within the assigned activity, provide recommendations for increasing contractor participation in a particular program, and assist in the evaluation of submitted VECPs.

**5. Establish, monitor, and enforce VE program savings goals.**

In order to encourage more Program Managers to actively seek cost savings in their programs, cost savings goals must be established, monitored, and enforced. The fiscal year 1996-1997 DOD VE Strategic Plan established a total DOD VE savings goal of one percent of Total Obligation Authority. The VE Strategic Plan applies to all DOD departments and agencies. The cost savings achieved within DOD during fiscal year 1996 were 0.3 percent of Total Obligation Authority [Ref. 3, p. 1]. In other words, DOD achieved 30 percent of its VE savings goal in fiscal year 1996. Another goal, also established in the VE Strategic Plan, is 100 percent documented VE activity in DOD's Major Defense Acquisition Programs (MDAPs). The documented VE activity for MDAPs in fiscal year 1996 was 22 percent [Ref. 3, p. 1]. DOD fell seventy-eight percent short of the MDAP VE cost savings target. In the opinion of the researcher, the goals established by the DOD VE Quality Management Board in the VE Strategic Plan are reasonable and attainable. The problem comes with monitoring and enforcing the VE savings targets. Program Managers must clearly understand the VE savings goals, have their program's progress toward the goals monitored by the chain of command, the Program Executive Officer and Defense Acquisition Executive, and be evaluated based on the program's performance toward achieving the established savings goals.

DOD has set VE cost savings targets, now Program Managers must be encouraged to invest the time, energy, and resources necessary to achieve these goals. Program Managers will actively encourage contractor participation in VE if program cost savings results are included as a part of the Program Manager's performance evaluation.

**6. The VE program needs greater DOD top management support.**

Eighty percent of Government and one hundred percent of contractor personnel interviewed indicated that there is insufficient support for the DOD VE program among top-level management in DOD. Insufficient top-level management support within DOD was also indicated as a problem in much of the literature reviewed in Chapter Three of this thesis. Since the inception of the DOD VE program in the 1950's, top-level support has been inconsistent. Some DOD leaders have seen the value of the VE program and emphasized it. Under these leaders, VE savings increased. Other DOD leaders have paid less attention to the VE program and VE savings declined. In order for the DOD VE program to achieve its full potential, top-level DOD management must lend the VE program consistent, forceful support. It is important for DOD leaders to issue periodic memorandums reminding acquisition personnel about the proven value of the VE program, but this kind of support alone is insufficient. Use of the VE program must be encouraged and closely monitored if it is to increase. DOD leaders must take positive steps to eliminate the barriers to more active contractor participation in VE that are presented in this thesis. Only then will the full potential of the DOD VE program be fully realized. All stakeholders, including taxpayers, contractors, soldiers, and sailors, will benefit from more active contractor participation in VE.

## D. SUMMARY OF RESEARCH QUESTIONS

In order to accomplish the objectives of this study, the following research questions were developed and investigated:

1. Primary research question. **What are the barriers inhibiting contractors from actively participating in the DOD Value Engineering Program, and what actions could be taken to increase participation?**

The barriers to more active contractor participation in the DOD VE program are insufficient funding, the VECP submission and approval process, a low level of VE awareness among acquisition professionals, and a lack of support for the VE program among top-level DOD management. The actions recommended to improve contractor participation in VE are the establishment of a centrally managed VE fund, streamlining the VECP process, VE awareness training, additional VE personnel resources, enforcement of VE savings goals, and greater top-level management support.

2. Secondary research question #1. **What will a literature review suggest are current barriers to contractors actively participating in the DOD Value Engineering Program?**

The literature review conducted in Chapter Three revealed the following barriers to more active contractor participation in VE:

1. There is a consistent lack of top management support of the DOD VE program.

2. There is inaccurate collection, reporting, and documentation of VE program savings.

3. The VECP submission and approval process is much too lengthy and cumbersome.

4. Insufficient funding is available to encourage and support contractor submission of VECPs thereby decreasing contractor participation in the DOD VE program.

5. An insufficient number of DOD acquisition personnel are assigned to encourage, promote, and support contractor VECP submittals.

6. VECP submission is a high-risk investment for the contractor that offers insufficient return to be attractive.

7. There is a low level of VE knowledge among DOD acquisition personnel, which results in reduced contractor VECP submittals.

3. Secondary research question #2. **What will a survey of contractor personnel suggest are current barriers to contractors actively participating in the DOD Value Engineering Program?**

The contractor respondents indicated four current barriers that prevent more active contractor participation in VE. The barriers uncovered were: a lack of Program Manager support for the VE program; insufficient funding for VECPs; the cumbersome VECP submission and approval process; and insufficient DOD top-level management support for the VE program.

4. Secondary research question #3. **What will a survey of Government personnel suggest are current barriers to contractors actively participating in the DOD Value Engineering Program?**

Government respondents indicated six current barriers to more active contractor participation in the DOD VE program. The barriers identified were: the perception that VE is not supported by the Government; the VECP submission and approval process; insufficient funding and manpower; a lack of VE training and awareness; lower defense acquisition program production quantities and fewer defense acquisition programs; and competition between VE and other cost saving initiatives.

5. Secondary research question #4. **What will a survey of contractor personnel suggest are actions the DOD could take to increase active contractor participation in the Value Engineering Program?**

Contractors recommended DOD take four separate actions to increase contractor participation in the VE program. The recommendations were: establish a centrally managed VE funding source; modify the VECP submission and approval process; establish VE participation metrics; and provide encouragement to contractors that wish to participate in the VE program.

6. Secondary research question #5. **What will a survey of Government personnel suggest are actions the DOD could take to increase active contractor participation in the Value Engineering Program?**

Government acquisition professionals recommended DOD take five separate actions to increase contractor participation in the VE program. The recommendations were: establish a centrally managed VECP funding source; increase acquisition professional awareness of the VE program; provide encouragement to contractors that wish to participate in the VE program; establish VE participation metrics; and modify the VECP submission and approval process.

7. Secondary research question #6. **What will analysis suggest about the likelihood that recent changes to the DOD Value Engineering Program will significantly increase active contractor participation?**

Analysis of the discussions with Government and contractor personnel, and analysis of the other data and reports collected as a part of this research effort, suggests that the FAR part 48 VE deviation issued by the Director of Defense Procurement will increase contractor participation in the VE program. The other recent change evaluated in this research effort was the inclusion of the requirement for Federal agencies to establish and maintain VE programs in the Fiscal Year 1996 National Defense

Authorization Act. Analysis and discussion of this change indicates it will have no impact within DOD.

8. Secondary research question #7. **What will analysis suggest are additional actions the DOD could take to increase active contractor participation in the DOD Value Engineering Program?**

The discussions and analysis of the data and reports collected as a part of this research suggests that the following six actions be taken by DOD to increase active participation in the VE program:

1. Establish a centrally managed DOD VE fund.

2. Streamline the VECP submission and approval process.

3. Increase VE awareness and training among Government and contractor personnel.

4. Ensure necessary VE personnel resources are available to the Program Manager.

5. Establish, monitor, and enforce VE program savings goals.

6. Provide greater top-level management support for the VE program.

## D. AREAS FOR ADDITIONAL RESEARCH

The following are recommended topics for further research:

1. Research the impact performance-based contracting will have on the future application of VECPs.

2. Determine methods not analyzed in this thesis to promote more active contractor participation in VE.

3. Analyze ways to improve Government participation in the VE program through VEPs.

4. Determine methods to improve subcontractor participation in the VE program.

5. Research the level of accuracy of the VE reports submitted by DOD agencies and compiled by the Office of the Under Secretary of Defense.

## APPENDIX A

### KEY VALUE ENGINEERING TERMS

**Acquisition savings** - Savings resulting from the application of a Value Engineering Change Proposal (VECP) to contracts awarded by the same contracting office or its successor for essentially the same unit. Acquisition savings include –

(a) Instant contract savings, which are the net cost reductions on the contract under which the VECP is submitted and accepted, and which are equal to the instant unit cost reduction multiplied by the number of instant contract units affected by the VECP, less the contractor's allowable development and implementation costs;

(b) Concurrent contract savings, which are net reductions in the prices of other contracts that are definitized and ongoing at the time the VECP is accepted; and

(c) Future contract savings, which are the product of the future unit cost reduction multiplied by the number of future contract units scheduled for delivery during the sharing period (but see 48.102(g)). If the instant contract is a multiyear contract, future contract savings include savings on quantities funded after VECP acceptance.

**Agency** - Executive department or an independent establishment within the meaning of sections 101 and 104(1), respectively, of Title 5, United States Code.

**Collateral costs** - agency costs of operation, maintenance, logistic support, or Government-furnished property.

**Collateral savings** - measurable net reductions resulting from a VECP in the agency's overall projected collateral costs, exclusive of acquisition savings, whether or not the acquisition cost changes.

**Contracted savings** - Net life cycle cost savings realized by contracting for the performance of a Value Engineering study or by a Value Engineering Change Proposal submitted by a contractor.

**Contracting office** - includes any contracting office that the acquisition is transferred to, such as another branch of the agency or another agency's office that is performing a joint acquisition action.

**Contractor's development and implementation costs** - costs the contractor incurs on a VECP specifically in developing, testing, preparing, and submitting the VECP, as well as those costs the contractor incurs to make the contractual changes required by Government acceptance of a VECP.

**Cost avoidance -** An action taken in the immediate time frame that will decrease costs in the future. For example, an engineering improvement that increases the mean-time-between-failures and thereby decreases operation and maintenance costs is a cost avoidance action.

**Cost savings -** A reduction in actual expenditures below the projected level of costs to achieve a specific objective.

**Future unit cost reduction -** The instant unit cost reduction adjusted as the contracting officer considers necessary for projected learning or changes in quantity during the sharing period. It is calculated at the time the VECP is accepted and applies either –

(a) Throughout the sharing period, unless the contracting officer decides that recalculation is necessary because conditions are significantly different from those previously anticipated, or

(b) To the calculation of a lump-sum payment, which cannot later be revised.

**Government costs -** Agency costs that result directly from developing and implementing the VECP, such as any net increases in the cost of testing, operations, maintenance, and logistics support. The term does not include the normal administrative costs of processing the VECP or any increase in instant contract cost or price resulting from negative instant contract savings.

**In-house savings -** Net life cycle cost savings achieved by in-house agency staff using VE techniques.

**Instant contract -** The contract under which the VECP is submitted. It does not include increases in quantities after acceptance of the VECP that are due to contract modifications, exercise of options, or additional orders. If the contract is a multiyear contract, the term does not include quantities funded after VECP acceptance. In a fixed-price contract with prospective price redetermination, the term refers to the period for which firm prices have been established.

**Instant unit cost reduction -** The amount of the decrease in unit cost of performance (without deducting any contractor's development or implementation costs) results from using the VECP on the instant contract. In service contracts, the instant unit cost reduction is normally equal to the number of hours per line-item task saved by using the VECP on the instant contract, multiplied by the appropriate contract labor rate.

**Life cycle cost -** The total cost of a system, building, or other product, computed over its useful life. It includes all relevant costs involved in acquiring, owning, operating, maintaining, and disposing of the system or product over a specified period of time, including environmental and energy costs.

**Negative instant contract savings -** The increase in the instant contract cost or price

when the acceptance of a VECP results in an excess of the contractor's allowable development and implementation costs over the product of the instant unit cost reduction multiplied by the number of instant contract units affected.

**Net acquisition savings –** The total acquisition savings, including instant, concurrent, and future contract savings, less Government costs.

**Sharing base -** The number of affected end items on contracts of the contracting office accepting the VECP.

**Sharing period** - The period beginning with acceptance of the first unit incorporating the VECP and ending at the later of –

(a) 3 to 5 years after the first unit affected by the VECP is accepted or,

(b) The last scheduled delivery date of an item affected by the VECP under the instant contract delivery schedule in effect at the time the VECP is accepted (but sees 48.102(g)).

**Total Quality Management (TQM) -** A customer-based management philosophy for improving the quality of products and increasing customer satisfaction by restructuring traditional management practices. An integral part of TQM is continuous process improvement, which is achieved by using analytical techniques to determine the causes of problems. The goal is not just to fix problems but to improve processes so that the problems do not recur. Value Engineering can be used as an analytical technique in the TQM process.

**Unit -** The item or task to which the contracting officer and the contractor agree the VECP applies.

**Value engineering change proposal (VECP)** - A proposal submitted by a contractor under the Value Engineering provisions of the Federal Acquisition Regulations (FAR) that, through a change in a project's plans, designs, or specifications as defined in the contract, would lower the project's life-cycle cost to the Government. Also, a proposal that –

(a) Requires a change to the instant contract to implement; and

(b) Results in reducing the overall projected cost to the agency without impairing essential functions or characteristics; provided, that it does not involve a change --

(1) In deliverable end item quantities only;

(2) In research and development (R&D) items or R&D test quantities that are due solely to results of previous testing under the instant contract; or

(3) To the contract type only.

**Value engineering proposal (VEP) -** A change proposal developed by employees of the Federal Government or contractor Value Engineering personnel under contract to an agency to provide Value Engineering services for the contract or program.

**Value Engineering -** An organized effort directed at analyzing the functions of systems, equipment, facilities, services, and supplies for the purpose of achieving the essential functions at the lowest life-cycle cost consistent with required performance, reliability, quality, and safety. These organized efforts can be performed by both in-house agency personnel and by contractor personnel.

## APPENDIX B

LIST OF TELEPHONE INTERVIEWS WITH ACQUISITION PROFESSIONALS

1. Ball, Henry, VE Administrator, Boeing, Seattle, WA., 24 April 1998.

2. Boudreau, Mike, Lecturer, Naval Postgraduate School, Monterey, CA., 05 May 1998.

3. Boyden, Al, Program Manager, Rockwell-Collins, Cedar Rapids, IA., 15 May 1998.

4. Coutee, Paul, LTCOL, USAF, Systems Engineer, Office of the Secretary of the Air Force, Washington, D.C., 04 May 1998.

5. Cuskey, Jeff, CDR, USN, Lecturer, Naval Postgraduate School, Monterey, CA., 06 May 1998.

6. Dove, Janice, VE Program Specialist, Army Aviation Missile Command, Huntsville, AL., 08 May 1998.

7. Fowler, Ted, VE Consultant, Fowler and Whitestone, Dayton, OH., 07 May 1998.

8. French, Steve, Chief of Systems Engineering, Office of the Assistant Secretary of the Army, Washington, D.C., 23 April 1998.

9. Gray, Mike, Engineering and Material Systems Branch Head, Department of the Navy, PEO Theatre Air Defense and Surface Combatants, Arlington, VA., 28 April 1998.

10. Hart, Mary, VE Manager, Defense Logistics Support Command, FT. Belvoir, VA., 23 April 1998.

11. Jacobs, Martin, Systems Engineer, Office of the Secretary of the Air Force, Washington, D.C., 04 May 1998.

12. Jines, Jean, VE Consultant, Java Inc., Fairborn, OH., 19 May 1998.

13. Kling, Paul, VE and Countermeasures Department Manager, Lockheed-Sanders, Nashua, N.H., 26 May 1998.

14. London, Ross, General Engineer, DCMDE, Boston, MA., 04 May 1998.

15. Lowen, Vicki, Industrial Specialist, Army Aviation Missile Command, Huntsville, AL., 30 April 1998.

16. Maldonaldo, Tito, General Engineer, DCMC, Washington, D.C., 22 April 1998.

17. Malloy, Dennis, VE Program Manager, NAVAIR, Patuxent River, MD., 23 April 1998.

18. Matthews, Dave, Lecturer, Naval Postgraduate School, Monterey, CA., 08 May 1998.

19. McAninch, Bill, Acquisition Specialist, Office of the Assistant Secretary of the Navy for Research, Development and Acquisition, Washington, D.C., 28 April 1998.

20. Miller, Terry, VE Manager, AFMC, Dayton, OH., 24 April 1998.

21. Mulholland, Tim, MAJ, USA, Staff Officer, Management Directorate, Office of the Chief of Staff of the Army, Washington, D.C., 28 April 1998.

22. Naegle, Brad, LTC, USA, Lecturer, Naval Postgraduate School, Monterey, CA., 15 May 1998.

23. Paulson, Larry, DOD VE Manager, Office of the Under Secretary of Defense for Acquisition and Technology, Washington, D.C., 30 April 1998.

24. Petrew, Dan, Senior Principal Contract Specialist, Boeing, St. Louis, MO., 30 April 1998.

25. Radocha, Frank, Contracting Officer, NAVSEA, Washington, D. C., 30 May 1998.

26. Ramsey, Nan, VE Manager, Army Material Systems Analysis Activity, Rock Island Arsenal, IL., 30 April 1998.

27. Rogers, Marlene, Senior Engineering Specialist, Bell Helicopters, Fort Worth, TX., 29 April 1998.

28. Schwartzman, Leonard, Engineer, Star Dynamics, Edentown, NJ., 07 May 1998.

29. Sgroi, Guiseppe, Program Manager, Army Communication Electronics Command, FT. Mommet, N.J., 30 April 1998.

30. Waszczak, Chuck, Assistant Professor of Contract Management, Air Force Institute of Technology, Dayton, OH., 01 May 1998.

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